SUMMER RAIN

PART I *SUMMER RAIN – DAWN* FOR TWO-CHANNEL TAPE;

PART II *AFTER THE SUMMER RAIN* FOR PIANO AND TWO-CHANNEL TAPE

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This dissertation contains five chapters: 1. Introduction, 2. Basic Digital Processing Used in *Summer Rain*, 3. Part I *Summer Rain – Dawn*, 4. Part II *After the Summer Rain* and 5. Conclusion.

Introduction contains a brief historical background of musique concrète, Electronische Musik, acousmatic music and music for instruments and tape, followed by basic descriptions of digital technique used in both parts of *Summer Rain* in Chapter 2. Also Chapter 2 describes software used in *Summer Rain* including "Kawamoto's VST," which is based on MAX/MSP, to create new sounds from the recorded samples using a Macintosh computer. In both Chapter 3 and 4, Kawamoto discusses a great deal of the pre-compositional stage of each piece including inspirational sources, especially Rainer Maria Rilke's poems and Olidon Redon's paintings, as well as her visual and sound imageries. In

addition Chapter 3 she talks about sound sources, pitch, form and soundscape. Chapter 4 contains analysis on pitch in the piano part, rhythm, form and the general performance practice. Chapter 5 is a short conclusion of her aesthetics regarding *Summer Rain*, which is connected to literature, visual art and her Japanese cultural background.

TABLE OF CONTENTS

LIST OF FIGURES

TABLE OF EXAMPLES FROM *AFTER THE SUMMER RAIN*

(NOTE the indicated time above only refers to time in the tape part not the time of the entire piece.)

CHAPTER 1

INTRODUCTION

Musique Concrète, Electronische Musik and Acousmatic Music

Musique concrète was founded by Pierre Schaeffer (1910-1995), who grew up in a musical family (both his parents were musicians) and earned a cello diploma. After studies at the Paris Polytechnic in the 1930s he became a professional radiophonic artist at the Radio Télévision Française (RTF) in Paris. In 1942, he directed musical acoustics research at the RTF and founded the group named Club d'Essai in 1946. His focus was drawn towards the use of recording techniques as a means of isolating naturally produced *objet sonores* (sound events) such as thunderstorms, steam engines, birdsongs, waterfalls and musical instruments for his compositions.

His experiences in the radiophonic art were merged into one of his first compositions, *Etude aux chamins de fer* in 1948. *Etude aux chamins de fer* included the sounds of six steam locomotives whistling, trains accelerating, and wagons passing over joints in the rails. With the collaboration of Pierre Henri, who was only twenty at that time, Schaeffer composed *Symphonie pour un Homme Seul* in

1949, in which they recorded directly onto discs with a lathe and edited them by playing back several discs simultaneously and switching between them with a mixer. Schaeffer wrote in his book *Machines à Communiquer,* 1972:

> The age of mechanism, denounced wrongly by Pharisees of spiritualism, is the age of the most inordinate human sensibility. It is not solely a question of machines for making, but of machines for feeling which give to modern man tireless touch, ears and eyes, machines that he expect to give him to see, to hear, to touch what his eyes could never have shown him, his ears could never have made him hear, to touch what his hands could never have let him touch. As this enormous puzzle, which knowledge of the exterior world is, composes itself, strengthens itself, verifies itself and finally 'sets' into shape, man recognizes himself in it: he finds in it the reflection of his own chemistry, his own mechanisms.

Although *objet sonores* and techniques he used for his compositions were unusual compared to traditional music, Schaeffer found humanity and beauty in them through radio technology, which created a new listening environment. We may hear the sound of the sea when we hold a shell up to our ears. Technically, what we are hearing is the sound of blood circulating in the ear, but we create an analogy associating the ear, the shell, and the ocean, which are transformed as man, instrument, and universe (Schaeffer, 1970 p.90).

In his treatise written in 1952, *Esquisse d'un solfége concret*, Schaeffer discussed the classifications of *objet*

sonores and basic processes used to transform them. The common techniques used in music concrète were, first of all, the recording of sound events, then amplification, juxtaposition, mixing and filtering of the sound events using turntables and tape-recorders. The original sound sources were transformed and/or broken into new *objet sonores*. Some transformed sounds remain links to the original sound, and others create autonomous identities. Just as Beethoven tried to express and imitate the natural sounds of thunderstorms and birds in his Symphony No. 6 using orchestral instruments, the development of technology in the twentieth century permitted a rediscovery of the value of natural and environmental sounds and made feasible the creation of new timbres — derived from natural phenomenon — that could be used in musical compositions. Moreover, John Cage[i]'s philosophy of 'noise', the European music scene, and the anti-German movements after the WWII in France were unavoidable stimuli for the birth of musique concrète. Schaeffer said in an interview with Tim Hodgkinson, "I was horrified by modern 12-tone music. I said to myself, 'Maybe I can find something different…maybe salvation, liberation, is possible.' ...The Viennese school was also inspired by scientific ideas, by a rigour

coming from a discipline which wasn’t music but an algebraic equation.”

Around the same time as the birth of musique concrète, in Germany, with the collaboration of Werner Meyer-Eppler, director of the Institute of Phonetics at the University of Bonn, and Robert Beyer, from the Westdeutscher Rundfunk (WDR)/Nordwestdeutscher Rundfunk (NWDR)[ii] in Cologne, Electronische Musik started to develop significantly. In 1953, Karlheinz Stockhausen worked in this Cologne studio and composed *Studie I* and *Studie II.* There was a strong influence of serialism in Electronische Musik as well as in the European acoustic music scene at that time: every element of composition, notes, loudness, timbre, duration, and articulation, was controlled by the series. The basic sound source used in Electronische Musik was created electronically, for example, by using sine wave, white noise, and pulse generators, as well as echo and reverberation to shape the final sound. In contradistinction to musique concrète, composition is established first on the theory of serialism in Electronische Musik rather than on listening. Luc Ferrari said in an interview with Brigitte Robindoré:

> ...*musique concrète* represented the avant-garde, but the bad boys of the avant-garde. The good boys were the

electronic music composers from Cologne... This avant-garde was not rejected, because it could follow a theory; one could establish in an absolutely scientific manner the exact pitch, dynamic, and the duration of a tone.

In 1951, Schaeffer reestablished his studio, which was named as Groupe de Recherche Musicales (GRM), and invited many important composers including Edgard Varèse, Olivier Messiaen, Pierre Boulez and Karlheinz Stockhausen. After working in GRM, during 1952-53, Stockhausen brought the idea of musique concrète, especially use of the recorded sounds as *objet sonore,* to the Cologne studio, and later he composed *Gesang der Jüngling* in 1956, in which a boy soprano's reading from the apocrypha to the Book of Daniel was recorded with a microphone. I believe there is something unique about using non-musical sounds as a compositional source. Composers are inspired by the *objet sonore* to generate new imaginary sound worlds. Schaeffer said:

The miracle of musique concrète (...) is that during experiments things begin to talk by themselves, as if they were bringing us messages from a world unknown to us. If I gather together fragments of noises, cries of animals, the modulated sound of machines, I myself also strive to articulate them like words of a language that I would practice without even understanding and without ever having learned it: I am deciphering hieroglyphics. Does the difficulty of this conversation arise from the fact that the person with whom I am speaking does not have the same faith as me in the secret correspondence between man and the world of which music is one of the keys?

So this is what art is: a translation whose exactness is periodically monitored by experiment; establishing by grouping around, rigorous correspondences between man and the world, the two universe similar in every respect, separated only by the surface of our skin.[iii]

Acousmatic music was the title of Chapter Four of Schaeffer's *Traité des objets musicaux*. According to the definition in Larousse, acousmatic principles were initiated in the Pythagorean brotherhood, who were required to listen, in silence, to lectures delivered from behind a curtain such that the lecturer could not be seen.[iv] Acousmatic music refers to the recognition of a sound without relation to its source. The newly processed sounds are detached from the original *objet sonore*. In addition, the concept of a space in which sounds are heard became an important element. In the 70's, François Bayles, who became Director of GRM after Schaeffer in 1966, preferred using the term, 'acousmatic music,' rather than musique concrete. In 1974, he created the *Acousmonium*, a loudspeaker orchestra specifically designed for playback. It consisted of eighty speakers of various sizes placed across a stage at different heights and distances. Bayles, standing in front of a mixer, performed his music through the loudspeaker orchestra to articulate the nuances of the

sounds using the audio space. Bayle called it the *morpho-concept*. He explained:

> The morpho-concept has to do with evolution of a sound—its timbre, shape, contour, elasticity, structure—as against the idea of notes. And the projection of sound into space is an integral part of that. It puts you inside the sound. It's like the interior of a sound universe.

Thus, acousmatic music became the next step to realize and develop Schaefer's concept of musique concrète.

Brief Background of Compositions for Instrument(s) and Tape

In the late 1940s, Varèse had been formulating an idea for a piece which would interpolate passages of sound material organized on magnetic tape with a live instrumental performance played by an orchestra. Then by 1950[v], an outline of *Dèserts* had been prepared (Manning, 1994). He recorded sounds from iron mills, saw mills, and various other factories in Philadelphia *as objet sonore* and transformed them into the tape parts. *Dèserts* had a huge impact in Europe and was rather controversial among *musique concrète* and Electronische Musik practitioners. In 1954, Varèse was invited to GRM by Pierre Schaeffer and completed the tape part for *Dèserts*. Varèse used electronic techniques including ring modulation, which was foreign to the GRM studio at that time.

Stockhausen's piece *Kontakte*, composed in 1959-60, was one of the most important works in the history of the Cologne studio. Originally, *Kontakte* was composed for unaccompanied four-channel tape and later Stockhausen added piano and percussion parts to be performed along with the tape part. This piece was unique because it combined traditional instruments and electronic sounds within the confines of a single composition. The instrumental version was performed on June 11th, 1960 at the 34th World Music Festival of the IGNM in Cologne by Christoph Caskel (percussion) and David Tudor (piano and percussion). Stockhausen's approach toward *Kontakte* was to integrate the different timbres between the synthetic tape part and live instrumental parts. The performers in *Kontakte* played a parallel and simultaneous performance, synchronized to the tape part. This had the effect of giving a "live" performance to the audience, as in the traditional concert format.

In Italy in 1955, an important studio was established by Radio Audizioni Italiane (RAI), with Luciano Berio as director (Manning, 1994). He also combined the tape part and the live instruments. For example, *Différences*, composed in 1958-60, was written for a quintet (flute,

clarinet, harp, viola and cello) and tape. For the tape part, Berio recorded the instrumental sounds and used them as *objets sonores*. Compared to *musique concrète* and *Electronische Musik*, Italian composers paid less attention to the philosophical and theoretical implications of their compositions. In 1956 Berio wrote in the periodical *Score,* published in Milan:

> Thus far pursuit of the other studios has been classified in terms of *musique concrète* and 'electronic music' which have become debatable definitions from today's armchair perspective since they seem to have been coined partly from retarded-futuristic pioneerism, partly to be 'dissociated from the rabble' and partly from a simple and legitimate desire to identify the objects of our daily discourse. In the long run, what really counts is the approach itself in its purest conception: it establishes an element of continuity in the general picture of our musical culture and is not to be identified only with its technical means but also with the inner motivation of our musical evolution.

Voice became an important source of *objet sonore,* and especially for Berio (*Thema—Omaggio a Joyce,* 1958) it was used for making noises, which was processed through a variety of electronic devices. Phonemes such as "DA," "ST," "FER," and "SA" are combined to produce nonsense speech which merges with non-verbal sounds of human communication including gabbles, laughs, moans, and sobs. In addition, the theatrical aspects performed by a vocalist, such as in *Visage* (1961), is another important

aspect of performance of his compositions. In the Stockhausen and Berio pieces mentioned above, the tape and instrumental part(s) are interactive and carefully synchronized.

In the United States, Milton Babbit, Mario Davidovsky and Jacob Druckman, worked in the Columbia-Princeton Electronic Music Center. Babbit's *Philomel* (1963) for soprano and tape used the twelve-tone technique with the RCA Mark II Electronic Music synthesizer. In 1962, Davidovsky began a series of works for instrument(s) and tape titled S*ynchronisms*. Davidovsky, who was also versed in the theory of the twelve-tone music, used the *pitches* of electronic sounds to blend with the timbres and gestures of the instruments. As a result, the tape part renforces and extends the capability of the instruments/performers. In addition to the *pitches*, Druckman tried to incoporate complicated rhythm patterns (which human beings are incapable of recreating) into his *Animus* series. In *Animus I for trombone and tape* (1966), Druckman took trombone sounds as *objets sonores* and processed them for the tape parts. He explained, "Like looking in a mirror and perhaps seeing a hostile, competitive image, I had the idea of a trombone player who's playing in a desultory fashion and

the tape becomes his mirror, in effect another trombonist but with a hostile, competitive stance” (Chadabe, 1997). InContrast to Europe, American composers’ use of tape was not primarily based on serialism. The tape part was mainly rhythm of the instrument. The tape part was an extension of the capability of instruments and performers, and using the same music vocabulary as the instruments so that the sound of the compositions created in this style became rather monotone compared to the sound of Stockhausen’s *Kontakte,* in which he used many different timbres in both tape and instrument parts.

On the other hand, Cage had a different idea about music. His tape piece, *Fontana Mix* (1958), is often played simultaneously with a performance of *Aria*. In *HPSCHD* (1969), Cage uses seven harpsichord players each playing at his own tempo with the playback of the fifty-one tapes created by Lejaren Hiller. The performance is not intended to be synchronous or interactive but is based on Cage's philosophical idea — indeterminacy. Thus, how the tape part related to the instruments was up to the composer’s imagination.

Basic Knowledge of *Summer Rain*

Summer Rain contains two parts: Part I: *Summer Rain – Dawn* for two-channnel tape and Part II: *After the Summer Rain* for piano and tape, which can be performed separately. The tape parts of *Summer Rain* are composed in the style of *musique concrète* or *acousmatic music* traditions. The basic techniques used here are sampling synthesis, granular synthesis and subtractive synthesis. The details regarding each synthesis will be discussed in the following chapter.

Summer Rain was composed in my home studio with a Macintosh Powerbook G3 (1988) under the Mac OS 9.0.4. The software used during composition consists of Cecilia, Csound, Granular 2.0 under the MAX/MSP environment, MacPOD 1.2, Macrohack 1.02, Peak 2 0.4 with plugins including CyberSound, Protools 4.3.2 including Audiosuite plugins, Real-Time Granular Synth 2.0, Prosonique TimeFactory 1.0.1, Soundhack 0.87, a program for VST plugins including GRM, TC and Prosonique Tools created by myself under the MAX/MSP environment, which will be discussed in the next chapter as well. All timbres in the tape parts were created using this software. They were then compositionally processed and mixed down to stereo in Protools.

[i] Cage had already composed *Imaginary Landscape No. 1* using variable-speed turntable in 1939.
[ii] Westdeutscher Rundfunk was called Nordwestdeutscher Rundfunk at that time.
[iii] Chion & Reibel, 1976, p.47.
[iv] Wishart, 1996, p.129.
[v] Varèse was living in New York at that time.

CHAPTER 2

BASIC DIGITAL SIGNAL PROCESSING USED IN *SUMMER RAIN*

Introduction

In this chapter, I will discuss briefly the basic digital signal processing techniques and software programs used in *Summer Rain*. The various techniques are discussed in the following categories: sampling synthesis, Hideko's VST, additive synthesis, subtractive synthesis, convolution granular synthesis, and sound spatialization and sound localization.

Sampling Synthesis

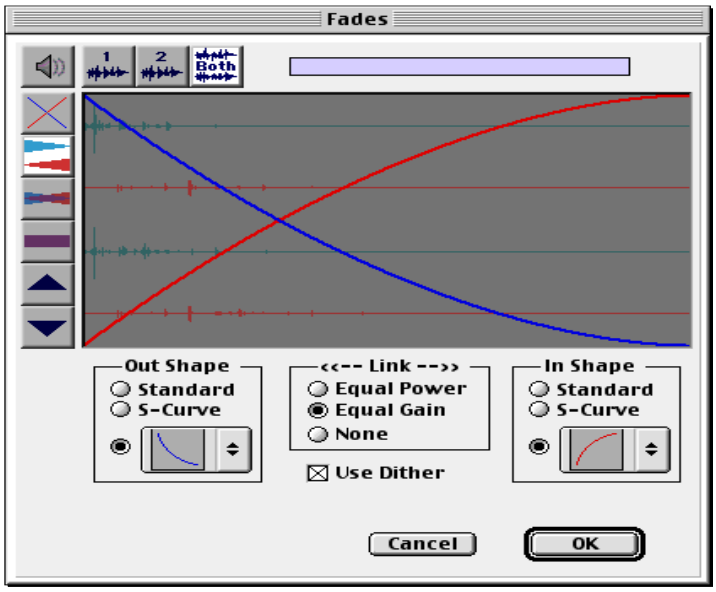
The idea of sampling synthesis derives from the tradition of musique concète. The common techniques of manipulating recorded sounds during the 1940s, used by Pierre Schaeffer and Pierre Henry, were cutting, splicing, then editing and rearrangement of sequences of the recorded sounds. In general, the term sampling is associated with a digital recording of a short sound using a computer. A sampling system scans a large wavetable that contains thousands of individual cycles. Since the sampled waveform changes over the attack, sustain, and decay portion of the event, the result is a rich and time-varying sound (Roads,

1995). The common techniques of the sampling synthesis used in *Summer Rain* are crossfading and pitch-shifting.

Crossfading is a kind of looping, resulting in the seamless extension of sounds. First, one pastes a sound onto the sound you want to combine with, then chooses the beginning and ending points of the overlapping part. In crossfading, the ending part of an outgoing sound file fades out overlapped by the beginning part of an incoming sound file. This crossfading process was done in Protools (Figure 1).

There are two ways of pitch-shifting: one is pitch-shifting with changing the duration,

Figure 1. Crossfading in Protools.

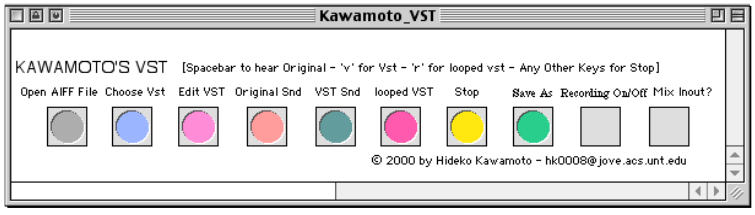


and the other is without changing the duration. The first method uses the time-domain pitch-shifting technique implying the duration of a sound is stretched out or compressed due to the change of the sampling rate while the pitch of the sound is altered. The second method uses the frequency-domain pitch-shifting technique using phase vocoder, which is used more frequently in *Summer Rain* and will be discussed in the additive synthesis in the following section.

Kawamoto's VST

Many digital synthesis techniques explained below are performed through a program called Kawamoto's VST (Figure 2), which I created using the MAX/MSP program. Hideko's VST was made to use 177 VST plugins including GRM, Hyperprism, Spark, TC tools, MDA, and PROSONIQUE plugins. One can hear an original sound and a processed sound using one of these plugins in real time and, this processed sound can be saved as a different sound file.

Figure 2. Kawamoto's VST.



Additive Synthesis

Additive synthesis is based on the summation of elementary waveforms to create a more complex waveform. The techniques of additive synthesis used in *Summer Rain* are the frequency-domain pitch-shifting using phase vocoder, time compression/expansion and resonance. These techniques are supplied from an analysis subsystem. The original sound is first analyzed, then the analysis data is modified by the composer. Next, the modified analysis data is used in resynthesizing the transformed sound. Therefore, this particular kind of additive synthesis is called additive analysis/resynthesis.

In general, pitch-shifting and time-shifting are usually used as a pair. By the frequency-domain pitch-shifting, the pitch of sound can be altered higher and lower with out changing the duration of sound. On the other hand, using the time-shifting technique, the duration of sound can be either stretched or compressed without altering the pitch. Time/pitch changing can be realized with various techniques such as by time granulation, harmonizer and phase vocoder. In *Summer Rain*, time/pitch changing was realized with the phase vocoder using

Soundhack, PROSONIQ TimeFactory, and AudioSuite under Protools environment.

Figure 3. GRM Reson for stereo for VST.

Resonance increases the amplitude of selected frequency partials such as in GRM Reson (Figure 3) for VST plugins through Hideko's VST. Delay is an effect that delays the onset time of each partial and smoothes their envelopes. As a result, it stretches a percussive timbre into prolonged synthetic passages (Roads, 1995). To realize this technique, AudioSuite (Protools) and GRM (Hideko's VST) plugins are used.

Subtractive Synthesis

Subtractive synthesis is associated with the use of filters to shape the spectrum of a sound source. Filters boost or attenuate selected regions of the frequency spectrum. In addition to the most common filters, lowpass, highpass, bandpass, bandreject, high shelving and low shelving, the comb filter is also used frequently in *Summer Rain* to create timbres. The comb filter has several regular sharp curves in its frequency response, in which the name of the filter drives from the shape of a "comb." GRM VST plugins for bandpass, bandreject[i] and comb filters (Figure 4), and AudioSuite plugins (Protools), Spark VST plugins (Hideko's VST) for other filters were commonly used.

Figure 4. (a) GRM VST Bandpass/Bandreject for mono (b) GRM VSTcomb filters for stereo.

(a)

(Figure 4. Cont'd)
(b)

Convolution

Convolution is a fundamental operation in digital audio processing in which a filter convolves its impulse response (IR)[ii] with the input signal to produce a filtered output signal. Convolution is used in filtering, modulation, reverberation, or cross-synthesis. In *Summer Rain*, convolution was used to operate cross-synthesis in Soundhack (Figure 5). The simplest convolution is denoted as:

$$output[a] = a[n] * unit[n] = a[n].$$

Here $unit[n]$ indicates a signal a with a unit impulse (IR), and n is defined as a number of time points. The operation

of convolution is indicated as "*." Thus, convolution is a multiplication of a signal input with IR.

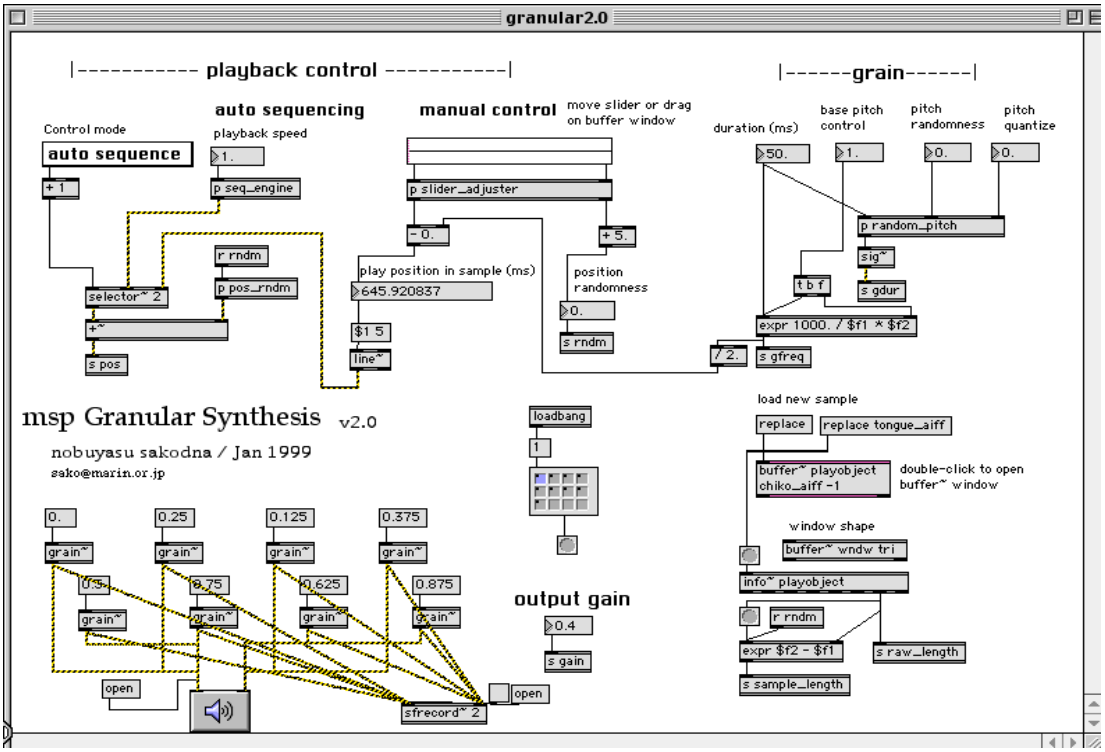
Figure 5. Convolution in Soundhack.

Granular Synthesis

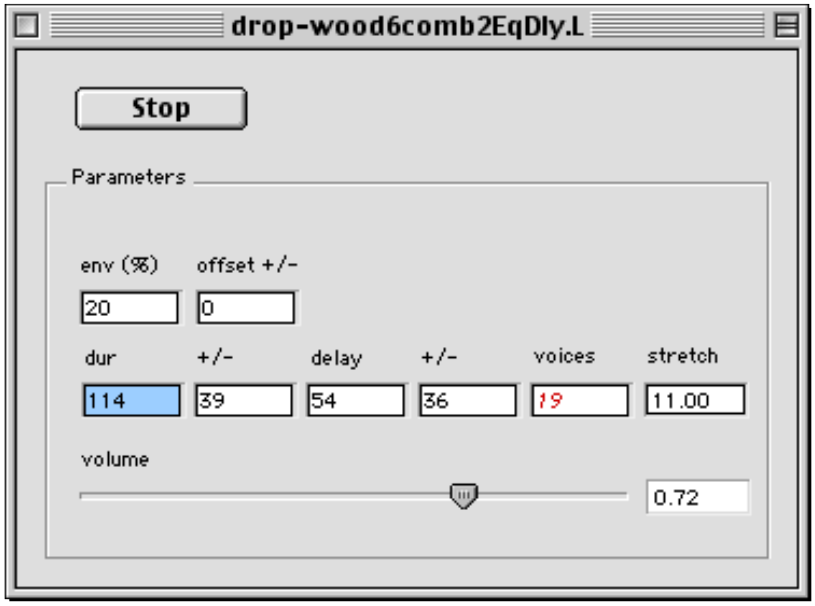
Granular synthesis builds up acoustic events from thousands of sound *grains*. A sound grain lasts a brief moment (typically 1 to 100 ms), which approaches the minimum perceivable events time for duration, frequency, and amplitude discrimination (Roads, 1995). Granular synthesis was realized using Granular 2.0 created by Nabuyasu Sakonda using MAX/MSP, MacPOD 1.2 and real-time granular synth 2.0 (Figure 6).

Figure 6. (a) Granular 2.0. (b) MacPOD 1.2. (Real-time Granular Synth 2.0.

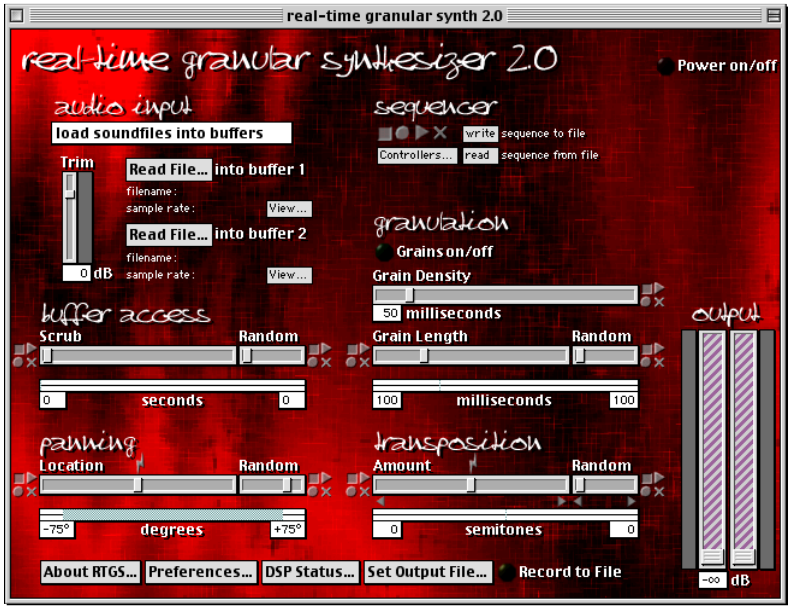
(a)



(b)



(Figure 6. Cont'd)
(c)



Sound Spatialization and Sound Localization

The history of sound spatialization goes back to the sixteenth century. The Venetian composers including Adrian Willaert, Andrea Gabrieli and Giovanni Gabrieli employed sound spatialization in their polychoral works. The choirs were divided into two or more to employ spatial antiphony. In these works, the main verse was heard from one side of a hall, and a response verse was sung from another side. Wolfgang Mozart composed works (K. 239 and K. 286) for separated orchestras. In addition, Hector Berlioz and Gustav Mahler wrote compositions for multiple orchestras

and choirs, and some were played off stage to create a sound image that was differed from an on-stage sound.

Associated with the development of technology in the twentieth century, many experiments of sound spatialization were tried by composers including Stockhausen (*Gesang der Jünglinge, Kontakte*), Varèse (*Poèm Electronique*), Xenakis (*Concret PH*) and Boulez (*Répon*). As discussed in Chapter I, sound spatialization was one of the most significant characteristics of acousmatic music. The Acousmonium was designed by GRM under the direction of François Bayle as a multichannel spatializer, which contained over eighty loudspeakers played through a 48-channel mixer in Olivier Messiaen concert hall in Paris in 1980.

The tape parts of *Summer Rain* are created for stereo. Therefore, during the compositional process, the stereo sound imaging using pan control, in which a sound can be moved from left to right or right to left, was always in my mind. In addition to panning, I used the PROSONIQUE Ambison VST plugin used in Kawamoto's VST to create three-dimensional sound images (Figure 7). The PROSONIQUE Ambison can control three angles of sound spatialization: azimuth (horizontal angle), distance velocity (for static

sounds) or (for moving sounds), and zenith or vertical angle (altitude).

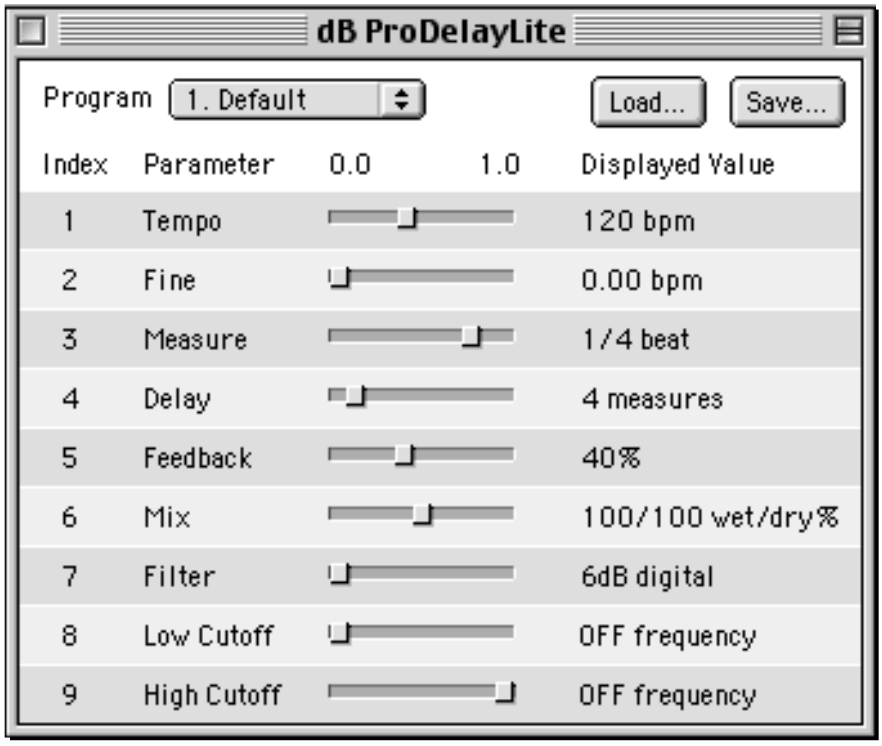
Figure 7. PROSONIQUE Ambison 2.0 for VST.

The idea of using three dimensions for spatialization was derived from the Ambisonic surround sound system first developed in Great Britain in the 1970s. Application of panning and ambisonics gives a sound not only a realistic sound imagery but also a visual imagery as well.

Sound localization can create the sound image of the location of a sound radiation. The study of sound localization is done extensively in the psychoacoustics field. Localization also uses three-dimensional angles, which were discussed above. The most frequently used localization techniques in *Summer Rain* are delay,

reverberation and Doppler effect, which create the illusion of the location of the sound emanation. Delay is created by the summation of direct sound and echo reflection (Figure 8).

Figure 8. db ProDelayLite for VST – one of the delay plugins used in Hideko's VST.



Reverberation can create space images of a space that simulate small, medium, and large halls (Figure 9). I used many reverberation programs including TC|Native reverb (VST), PROSONIQUE Reverb plugins (VST) to create different sizes of rooms, and D-fx D-Verb (AudioSuite). As you see

in Figure 9, a user can control the size and shape of the halls, prodelay time, delay time and duration of reverberation. Also color and diffusion can be added to characterize the sound.

Figure 9. TC|Native Reverb VST plugin used in Hideko's VST.

The Doppler shift was first described by the astronomer C. Doppler in 1842. It is a simulation of moving sound source associated with the velocity of the sound source. In computer music, it was adopted by John Chowning in 1971. Doppler shift is a change in pitch that results when the source and the listener are moving relative to each other. (Roads, 1995). For example, as an emergency vehicle with a

siren approaches and passes at high speed, the pitch of the siren is shifted downward. GRM Doppler for VST was used to realize the Doppler effect to create an illusion of sound localization as well as delay and reverberation.

Figure 10. GRM Doppler for stereo used in Hideko's VST.

Throughout this chapter, I have provided the basic digital synthesis techniques and software information used in *Summer Rain*. I shall discuss my musical background including inspiration, compositional approach and process in the following chapters.

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[i] Both bandpass and bandreject can be done in the GRM Band Pass.
[ii] The impulse response of the filter is the output signal generated by a filter that is fed a unit impulse (Roads, 1995).

CHAPTER 3

PART I *SUMMER RAIN – DAWN* FOR TWO-CHANNEL TAPE

Pre-compositional Stage

Many times inspiration for my compositions come from extra-musical resources such as poems, visual art and dreams. Also, fragments of pieces by other composer give me inspiration. Those inspirations are developed in my head and start making sounds and music in my ears during the pre-composition stage. I have pretty concrete ideas about a composition in terms of timbre, mood, gesture, feeling and overall structure. Although the compositional tools and their technicality are different, writing a piece for elecroacoustic media is no different from writing for instruments in terms of expressing my musical ideas.

Part I *Summer Rain – Dawn*, dedicated to my mother, Yoshiko Kawamoto, was inspired by a French poem of a German poet, Rainer Maria Rilke, *(Nos Pleurs)* [(Our Tears)] from *Migration des Forces* (The Migration of Powers), translated into English by A. Poulin, Jr.

(Nos Pleurs)

Avid for that dew,
The Angels love our tears;
Sometimes we are theirs
Because of our humid cheeks.

Leaving, they dry our face
With the stroke of a wing,
Never seeing it so pure,
Already far from us….

– by Rainer Maria Rilke

Before I encountered this poem, I had vague sound and visual imagery for my composition, which became more specific after percolating them in my mind. The imagery was made with rain, tears and forest, which included trees, foliage, the grounds, and spider webs. First, these objects were all shiny and wet, and rather in my mind. The season for the piece has to be steamy and hot summer time, in which I imagined the sound and visual imagery. The time is dawn and still dim outside, especially in the forest. Summer rain, pouring onto the forest, nourishes every life in it, deepening the colors of trees, leaves, and the ground, making spider webs into a shimmering silver labyrinth. Your cheeks are wet due to your tears, and also due to rain poring onto you. Caught by not only the forest but also color-changing trees, leaves, ground, and silver spider webs, you start going into a illusionary world, in which there is not any clear distinction between rain and tears; your tears are all rain, and all rain is your tears.

In addition, feeling numb, one loses the sense of standing on the ground so that you can not tell whether you are moving around the still objects, or these objects are moving around you. The surrounding objects start having lives of their own. However, from my point of view as the composer of this piece, the illusion one has in this piece is not a mere illusion but reality; rain is one's tears, and all surrounding objects are in charge of moving around him/her in spite of one's wish. In this piece, I wanted to create surrealistic sound imagery of illusion turning into reality.

Rilke's sensibility and visual imagery in *(Nos Pleurs)* fit into my own imagination. The poem itself is simplified and condensed in a few lines, helped me to expand my imagination and gave the direction of the overall mood of Part I. Usually tears are associated with sadness. However, I felt Rilke's sensibility toward tears was expressed rather light-hearted, although he was dealing with many tears of human beings in this poem. I felt there was some kind of relief for letting tears flow from one's eyes, which implied the existence of hope to a certain extent. By reading Rilke's poem, my fragmented imagery started unifying as a whole piece, blending with my visual

and sound imagery. It gave me artistic and compositional direction during both sound processing and the compositional process.

Sound Sources

The basic sound sources used in both parts of *Summer Rain* including are piano, two different sizes of wooden sticks, round wooden lid, small star-shaped plastic objects, and coincidental noises occurring during the recording such as footsteps on the stage. The recording was made in the Concert Hall at the University of North Texas in November 1999 using an AKG stereo microphone and TASCAM portable digital audiotape (DAT) recorder.

For the piano sounds, the microphone was set about 25 cm away from the high register of piano strings inside the Steinway concert piano with the lid fully opened. All piano sounds were played and recorded by myself, which included muted, scraped, and bounced sounds on the piano strings. The muted sounds were made by pressing the string with fingers when its piano key was struck. Those sounds were recorded in two ways: con pedale and senza pedale until the sounds died naturally. The lower muted sounds had richer, mellower and darker percussive sounds. The scraping and bouncing sounds were also created by using the

strings of the piano. The main tools used for scraping were metallic objects (e.g., keys), and wooden objects (e.g., different sizes of sticks). The lowest part of the piano register, in which the thick coiled piano strings were used, worked very nicely with both fast and slow scraping. The fast scraping created brighter sound, rich in high partials. The slow scraping emphasized darker tones.

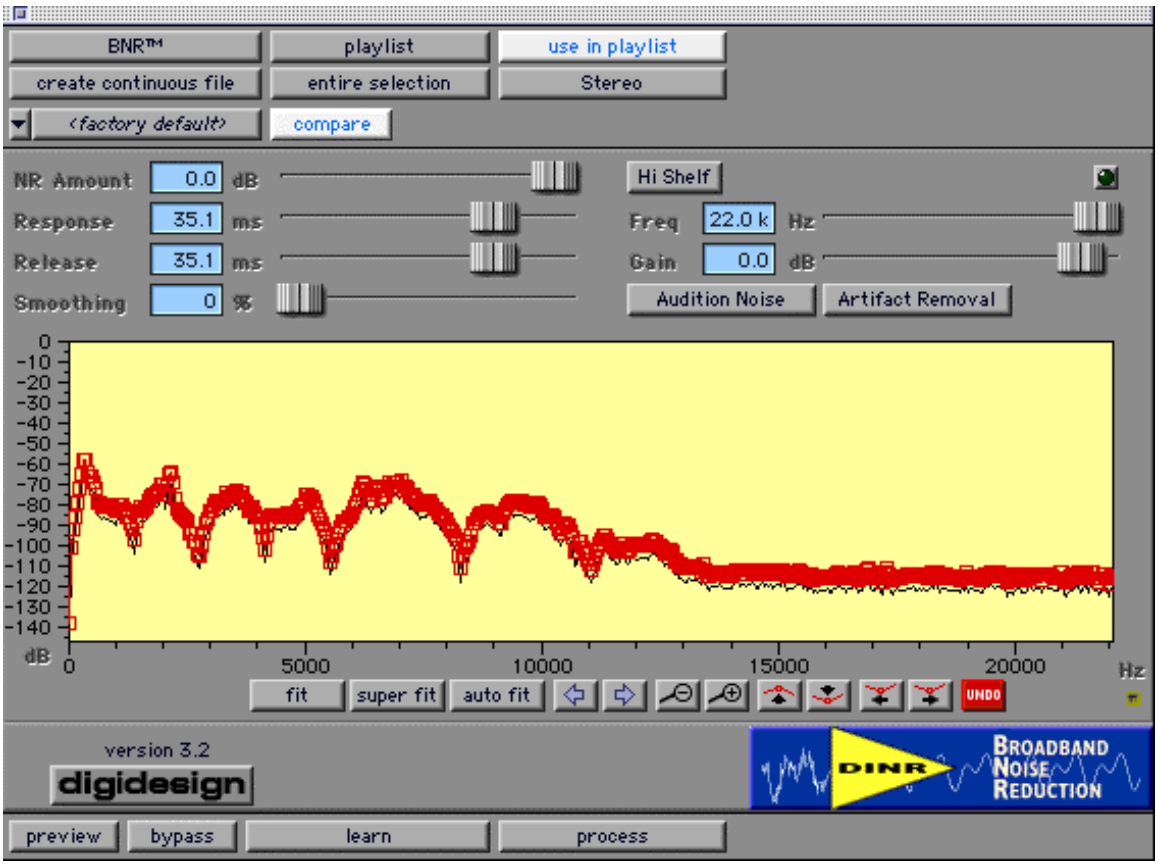
For non-piano sounds, such as two different sizes of wood sticks, round wooden lid, small star-shaped plastic objects, the microphone was moved away from the piano and placed in the middle of the hall. These objects were mainly rubbed, hit, shaken, and dropped on the floor.

The recorded sounds were transferred digitally into a Protools session using a Macintosh Desktop G3 in the CEMI (Center for the Experimental Music and Intermedia) studio using the Panasonic DAT Recorder SV-3700. Then those recorded sounds were brought to my PowerBook G3, in which all compositional processing was done in my home studio.

The major problem of the recording was the low rumbling noise of the air-conditioning in the hall. To get rid of the noise, I used several plugins such as Ray Gun and Ionizer under Peak environment and filters and Band Noise

Reduction (BNR, Figure 1) in AudioSuite under Protools environment.

Figure 1. Band Noise Reduction (BNR): AudioSuite under the Protools.



In general, noise reduction units compress on recording and expand on playback. The compressor stage reduces transients and boosts the rest of the input signal to an artificially high level. As a result of noise reduction, it creates side effects including the distortion and

artifacts in the transient sounds (Roads, p. 395). Thus, the process of noise reduction was very tricky and time-consuming for not sacrificing the original sound too much yet getting rid of the rumbling noise from the sound source in order to make the recording sounds cleaner.

Realization of the Visual Imagery

Each sound source represents my visual imagery discussed above. For instance, the sampled piano sounds were mainly used to create rain and tears. I wanted to have shimmering, wet, and steamy yet gentle sounds. Also, the glissandi on the high piano strings were processed imagining the angel's wing stroke and shinning silver spider webs. The wooden sticks and wooden lid represented trees, and the sounds of the plastic objects represented rain pouring on trees. The coincidental noises including footsteps represented human beings walking in the forest.

Composers of not only electroacoustic music but also acoustic music (written for the traditional instruments) attribute their musical imagination to understanding nuance and articulation of each timbre, which create various colors. To create appropriate timbre, composers carefully choose the right articulation, which helps to shape and to enforce the musical gestures. For example, violin can have

many different timbres such as pizzicato, sul tasto, col legno, and sul ponticello, and composers used these different colors effectively in their compositions. For today's electroacoustic music scene, the different colors can be created with the association of computer, mainly called digital audio synthesis. The common digital audio techniques used in my work include pitch-shifting, filtering, delaying, granular synthesis, reverberation, and panning (see Chapter II). For me, the sound imagery I have during composition decided which timbres/colors I needed to make. Then I approached them thinking how each sound source, such as piano and wood, should be processed to create the sound I was searching to realize the visual imagery into sounds.

Pitch in General

In traditional music, usually the twelve pitches in octave and/or the quartertones are used. All the processed sounds in *Summer Rain – Dawn* derive from the sampled sounds, which first seem far from the concept of pitch. In electroacoustic music, controlling pitches is a very general technique to create and add different colors on composers' compositional palettes In *Summer Rain*, I used phase vocoder in Soundhack, Prosoniq's TimeFactory, pitch

shift AudioSuite in Protools, and GRM Pitchaccum VST plugin using Hideko's VST under MAX/MSP environment, which was discussed in Chapter II. Using these programs, composers have control over pitches, not only shifting them by semitones but also by cents for more precise needs.

Form

The basic form of Part I: *Summer Rain – Dawn* is moment form, which Stockhausen first articulated in his 1960 article "Momentform." His article was associated with his composition for *Kontakte*, composed in 1959-60. Stockhausen writes:

> Every present moment counts, as well as no moment at all; a given moment is not merely regarded as the consequence of the previous one and the prelude to the coming one, but as something individual, independent and centered in itself. Capable of existing on its own. An instant does not need to be just a particle of measured duration. This concentration on the present moment – on every present moment – can make a vertical cut, as it were, across horizontal time perception, extending out to timelessness I call eternity. This is not an eternity that begins at the end of time, but an eternity that is present in every moment. I am speaking about musical forms in which apparently no less is being undertaken than the explosion -- yes — even more, the overcoming of the concept of duration.[i]

Summer Rain – Dawn can be divided by thirty-seven moments:

[1]	0 – 0:30	(30")
[2]	0:30 – 0:40	(10")
[3]	0:40 – 1:10	(30")
[4]	1:10 – 1:40	(30")

[5] 1:40 – 2:20 (40")
[6] 2:20 – 2:28 (08")
[7] 2:28 – 2:43 (15")
[8] 2:43 – 3:16 (33")
[9] 3:16 – 3:40 (24")
[10] 3:40 – 4:01 (21")
[11] 4:01 – 4:40 (39")
12] 4:40 – 4:56 (16")
[13] 4:56 – 5:22 (26")
[14] 5:22 – 5:55 (33")
[15] 5:55 – 6:25 (30")
[16] 6:25 – 6:57 (32")
[17] 6:57 – 7:15 (18")
[18] 7:15 – 7:40 (25")
[19] 7:40 – 8:02 (22")
[20] 8:02 – 8:10 (08")
[21] 8:10 – 8:26 (16")
[22] 8:26 – 8:46 (20")
[23] 8:46 – 8:55 (09")
[24] 8:55 – 9:35 (40")
[25] 9:35 – 9:47 (12")
[26] 9:47 – 10:13 (26")
[27] 10:13 – 10:59 (46")
[28] 10:59 – 11:10 (11")
[29] 11:10 – 11:15 (05")
[30] 11:15 – 11:26 (11")
[31] 11:26 – 11:43 (17")
[32] 11:43 – 11:51 (08")
[33] 11:51 – 12:02 (11")
[34] 12:02 – 12:29 (27")
[35] 12:29 – 12:40 (11")
[36] 12:40 – 12:53 (13")
[37] 12:53 – 13:06 (13")

With my visual imagery, the concept of time of *Summer Rain – Dawn* was built on vertical time than linear time, with fragments of sound events. The imagery was superimposed, which led to the surrealistic direction of the piece. The construction of visual imagery is not narrative, which suggests linear motion, but rather collage-like.

However, with the use of moment form I had a proportional scheme, the golden mean (0.618:1), to control the horizontal aspect, which is time, in my mind during the compositional process. The use of the golden section has a long history that originated with ancient Greek architecture. The golden section in music is seen in the works by the Medieval composers such as Guillaume Dufay (*Nuper rosarum flores*, 1436) as well as in the works of Claude Debussy (*Jeux*, 1912-13) and Béla Bartók *(Concerto for Orchestra*, 1942-3).

The purpose of using the golden section for me is to create the momentum of the piece. The golden section of *Summer Rain – Dawn* occurred at section [21], 8:10, where the high metallic sound was heard suggesting the shimmering silver spider web. By setting up the golden section, the fragments of sound/visual imagery were integrated and unified as a whole. I had a feeling for the length of duration, which was about thirteen minutes in the pre-compositional stage. Therefore I knew there had to be some momentum for about eight minutes of the piece. Instead of having a big dramatic bang, I focused to have a quiet yet dramatic moment to fit into my sound/visual imagery to create an unexpected turn of the piece. It was separated

from the percussive gestures from the former section and led to the rest of the piece.

Soundscape

The history of spatialization in music is rather long. In the sixteenth century, Adrian Willaert and his pupil Andrea Gabrieli employed spatial antiphony in their compositions by replacing two or more choirs in separate places. In addition, W.A. Mozart wrote compositions (K.239 and K. 286) for two spatially separated orchestras. Hector Berlioz, and Gustav Mahler used offstage performers with multiple orchestras and choruses in their works. Sound spatialization was a very important element of music to these composers as well as pitch, duration and form.

With the invention of loudspeakers in the twentieth century, many spatialization experiments have been carried out. These significant works are Stockhausen's *Gesang der Jünglinge* (1956), projected over five groups of loudspeakers; Varèse's *Poèm electronique* (1958); and Iannis Xenakis's *Concret PH* (1958). They were projected over 425 loudspeakers through an eleven-channel sound system at the Brussels World's Fair in 1958. Starting in the 1970s, the spatialization for loudspeakers has been experimented with in Groupe de musique expérimentale de Bourges (GMEB),

Groupe de Recherches Musicales (GRM), Tempo Reale studio in Firenze, Italy (Roads, p. 454) and Birmingham ElectroAcoustic Sound Theatre (BEAST) in Birmingham, England.

Basically, there are three dimensions in space: Azimuth, Distance, and Zenith. Spatialization is closely related to psycoacoustic study. It creates the three-dimensional surrealistic soundscape or sound sculpture to audiences. In *Summer Rain*, azimuth, the horizontal angle, was controlled by panning (left and right) in Protools. More complicated spatialization for all three dimensions weas experimented in Soundhack's Binaural Filter, Prosoniq's Ambison, and GRM's Doppler. The last two were VST plugins used in Hideko's VST (MAX/MSP). In these programs, one has more controls over spatialization. For example, the perception of Azimuth is extended to surrounding images including not only left and right but also front and back of the audience. Prosoniq's Ambison can control moving images of space (see Chapter II) as well as the fixed (non-moving) images. In Kawamoto's VST, the user can record changes of parameters in real time. The combinations of all three dimensions were endless and can create realistic and surrealistic soundscapes.

Although *Summer Rain* was composed for stereo channels, it should be projected through at least eight speakers carefully placed in a hall and needs to be diffused to enforce the space imagery. Sound diffusion is a very important part of the performance of this piece. The size and acoustics of each hall is different, as well as the configuration of loudspeakers. Therefore, each performance depends on how musically the sound diffusionist can perform in order to give a life in recorded music.

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[i] Cited from Kramer's Moment Form in Twentieth Century Music in The Music Quarterly, April 1978, which he quoted from Text I, p. 199, trans. Seppo Hsikinheimo in his book the Electronic Music of Karlheinz Stockhausen (Helsinki, 1972), pp. 120-21.

CHAPTER 4

PART II *AFTER THE SUMMER RAIN* FOR PIANO AND TAPE

Pre-compositional Stage

Part II of *Summer Rain, After the Summer Rain* for piano and tape, is dedicated to the memory of Clarence Asher Peevey (June 17 – 28, 2000), and written for pianist and mother of Clarence, Cecilia Ho Peevey in 2000. At the same time, this piece was inspired by a German poem by Rilke, "Vor dem Sommerregen" (Before the Summer Rain) translated into English by C.F. MacIntyre:

> Vor dem Sommerregen (Before the Summer Rain)
>
> Suddenly in the park from all the green,
> One knows not what, but something real is gone;
> One feels it coming, silent and unseen,
> Toward the window. Urgently and strong,
>
> Out of the wood the dotterel implores—-
> Until one thinks of Saint Jerome: such zeal
> And loneliness rise in one voice, which shall
> Be answered when the rain begins to pour.
>
> Now the walls and pictures of the room
> Grow dim, as if pushed suddenly away,
> As if they dared not hear the words we say.
>
> And on the faded hangings falls the chilled
> Uncertain light of afternoon: the gloom
> In which one felt so frightened, as a child.
>
> —- by Rainer Maria Rilke
> trans. by C.F. MacIntyre

I encountered this poem at the same time as "*(Nos Pleurs)*" by the same poet, which influenced Part I *Summer Rain – Dawn*. To me, tears in "*(Nos Pleurs)*" and rain in "Vor dem Sommerregen" were identical. Also, “green” and “wood” in "Vor dem Sommerregen" overlapped the visual imagery I had for Part I. The feelings I felt through *Vor dem Sommerregen* were mysterious, quiet, gloomy, fading away, lonely, sudden, and yet strong. After reading both poems, I started wondering how I would feel after all rain/tears and dramatic emotions were flowing out.

While I was composing the middle of Part I, I heard that my dear friends Cecilia and Shannon Peevey’s new-born baby Clarence had suddenly passed away after eleven days since his birth. This unexpected incident and what they were going through were beyond my understanding, although I could feel tremendous sadness from them. Knowing nothing could be changed but accepting this sad truth, I wanted Part II to represent my own view of Cecilia and Shannon’s life experience. However, *After the Summer Rain* was not meant to be a requiem, but rather a personal dedication to Cecilia, Shannon and Clarence.

Piano and Tape

For *After the Summer Rain*, I wanted to have piano as a

live instrument with the tape part. Many sound sources in the tape were derived from piano as in Part I. To me, to compose a piece for piano and tape meant unification of my studies in both piano performance and composition, which includes acoustic and electroacoustic media.

Building music upon acoustic and electroacoustic instruments was challenging in terms of how to decide the role of each part, how to interact these media in the piece and how to blend instrumental and synthetic timbres. The piece for traditional instrument and tape, so called 'tape plus,' is similar to a concerto of the common practice period. In general, the solo instrument, on one hand, takes a dominant role employing virtuoso techniques; on the other hand, it accompanies the entire orchestra playing the main role in the music.

The most significant difference between the traditional concerto and 'instrumental plus' is that the latter is prerecorded. Therefore, the live performer needs to fit into the fixed tape part, which seems, at first, to not allow freedom to the soloist. However, within the given time, a soloist can be flexible in a way that is similar to the idea of *rubato*, one of the trends used by the

nineteenth-century composers including Frederic Chopin and Franz Liszt.

Although many sounds in the tape part were made from piano, they became dissimilar from the original sounds after they had undergone a few digital processes. In addition to the processed sounds formerly created for Part I, many sounds were newly processed from the same sound sources using the digital synthesis techniques discussed in the earlier chapters. Some percussion sounds including water bells and drum were newly added.

With the combination of piano and non-piano sounds in the tape part, it was challenging to decide the roles of two very different media and how their timbres should blend with each other and integrate as the piece proceeds. For me, the piano part represented human beings who walked through the raining forest. Reminiscences of many emotional life incidents in the forest were constructed in the tape part. The direction of the piano part, on the other hand, was to relieve these extreme emotions and to fold down into small pieces.

Score

The full score consists of the piano and the tape parts. The tape part is taken from the stereo bounced

mixed version from the Protools session. The tape part merely shows waveforms over time in seconds. Each system consists of the total of fifteen seconds. The purpose of using the audio form is for the piano to coordinate with the tape part. However, the piano part can be rather flexible within the given time frame of the tape. As I discussed before, the piano part should be played in the style of *rubato* with the fixed tape part.

Pitch and Interval Relationships in the Piano Part

The core pitch material was taken from the name, "Clarence," to whom Part II is dedicated. Many composers including Robert Schumann, Maurice Ravel and Dmitri Shostakovich, used musical subjects derived from letters of the alphabet (soggetto cavato). The alphabet from "A" to "H" was repeated to all other letters from "I" as follows:

Alphabet:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Solmization	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H

Q	R	S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	A	B

As a result, the pitches employed from "Clarence" were C-D-A-B-E-F-C-E, which were translated in two ways: C-D-A-B-natural-E-F-C-E and C-D-A-Bb-E-F-C-E if one takes liberty of translating "B" in both English ("B-natural") and German "Bb" ways.

Combining all possible pitches creates a cluster with seven different pitches: A-Bb-B-natural-C-D-E-F. To me the sound of the cluster is rich, which resembles the color of black. Odilon Redon (1840-1916), a French Symbolical painter, had been known for using black exclusively for his works until his late period. In his late period Redon started using all different colors in his pastel drawings. As Tatsuhiko Shibuya discussed in his essay, "Black of Redon," about his pastel drawings, "...Redon merely liberated every color that was subconsciously enclosed in the color of black."[i] This comment was made as a reaction against the common understanding of Redon's transition to his late period as a radical change.

In *After the Summer Rain*, scattering the pitches of the cluster horizontally in the piano part is to liberate all colors that are frozen in black while the vertical cluster sonority is representing the origin of every color—the color of black. The motivic pitches were used both horizontally and vertically thoroughly in the piano part. For example, the beginning passage (1'00 of the tape part) in the soprano starts with C-D (Example 1). After D is repeated, A and Bb are introduced. On 1'08" the first two pitches of "Clarence" are followed, establishing an upward

whole step motion, by B-natural suggesting the semitone relationship among A, Bb and B-natural. The vertical sonority using these three pitches is heard on 1'10 emphasizing ambiguity or cluster sounds.

Example 1. Piano passage starting from 1'00 of the tape part.

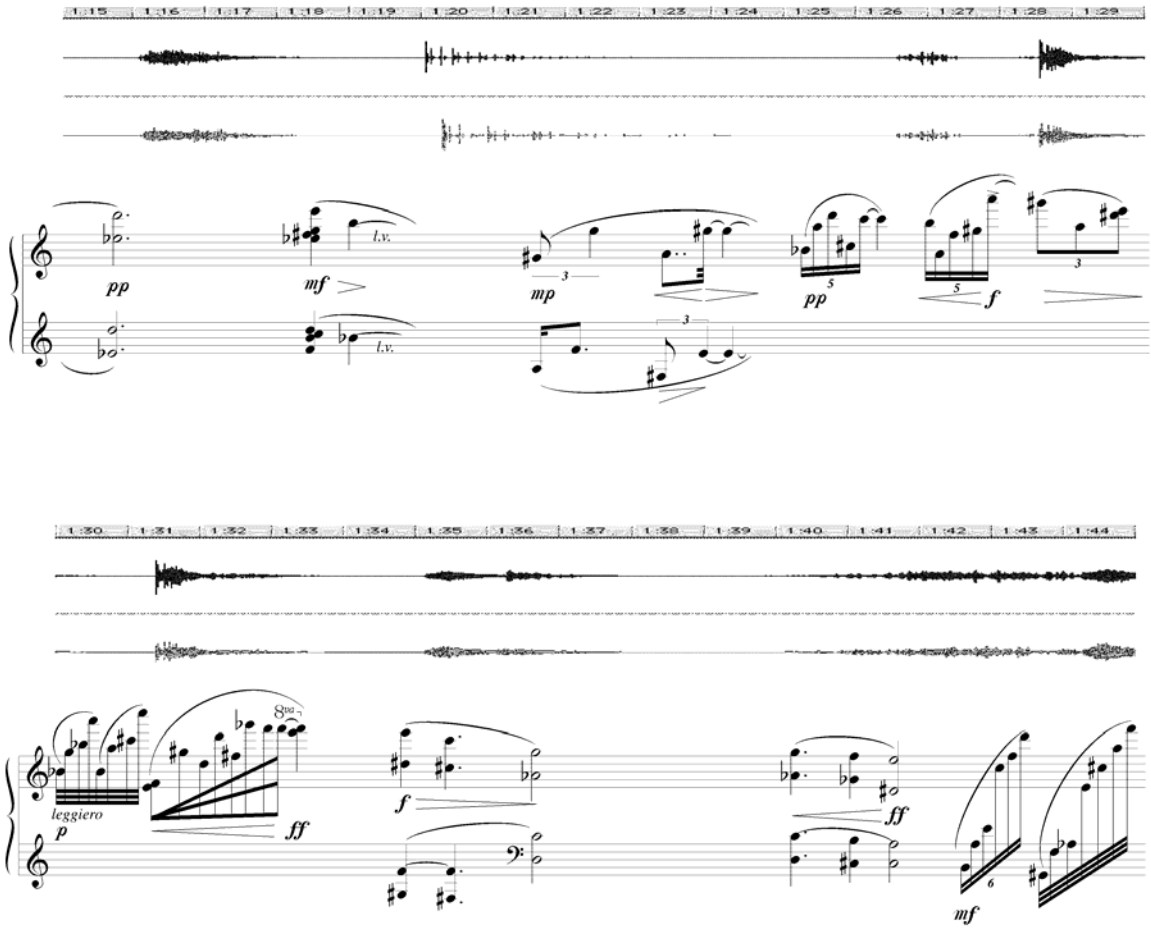
The interval relationships are dominated by minor ninth, Major seventh, Major/minor second, Perfect fifth and tritone (Example 1). They are all derived from the "Clarence" motive and heard throughout the piece. The inversion of both minor ninth and Major seventh creates minor second sonority, which is based on A-Bb-B-natural. Also, Perfect fifth and tritone are a semitone above each other emphasizing the mysterious mood.

The first two (C-D) pitches, creating Major second, have rather stabilized sonority compared to other core intervals. However, the gesture of upward Major second

expresses a wondering atmosphere. At 2’27 C-D is followed by A-B, resulting in the first four letters of “Clarence” being spelled out. At 2’38 C-D, which is reharmonized with Major sevenths and Major sixths, leads to B-natural, in which the outer frames of both hands are Major seventh at 2’43. The last four notes of the motives, E-F-C-E, are spelled out rather sparsely starting from 1’18 to 1’42: E on 1’19, F on 1’33, C on 1’35 and E on 1’42 with ornamentation between each note (Example 2).

As the piece proceeds, the interval relationship of the two-note (C-D) upward gesture increases. After a C-Db ad libitum gesture starting at 3’07, this two-note gesture is replaced with some variations such as a three-note descending line, B-G-E, at 3’16, a two-note ascending line, C-A at 3’22 and a four-note descending line, D-B-E-D, at 3’30. The motivic variations continue directing a momentum at 4’02, with the larger intervals of two-note ascending and descending gestures such as C-B, Db-C, D-E, A-Bb and Eb-A emphasizing Major seventh, minor seventh, Major ninth and tritone (Example 3.) The arpeggio figures between 4’11 – 4’30 contains ninth, seventh, sixth and tritone followed by an accent of ascending two-note figure, A-C, at 4’36.

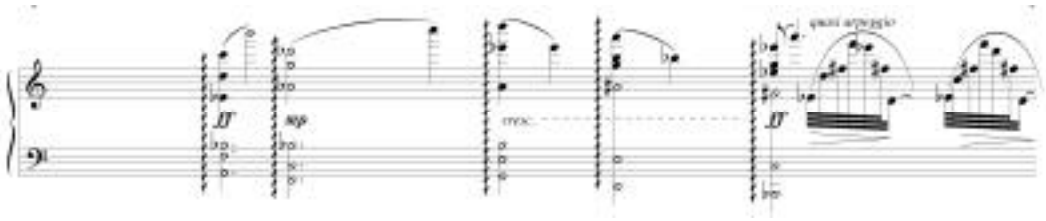
Example 2. 1'15 – 1'45.



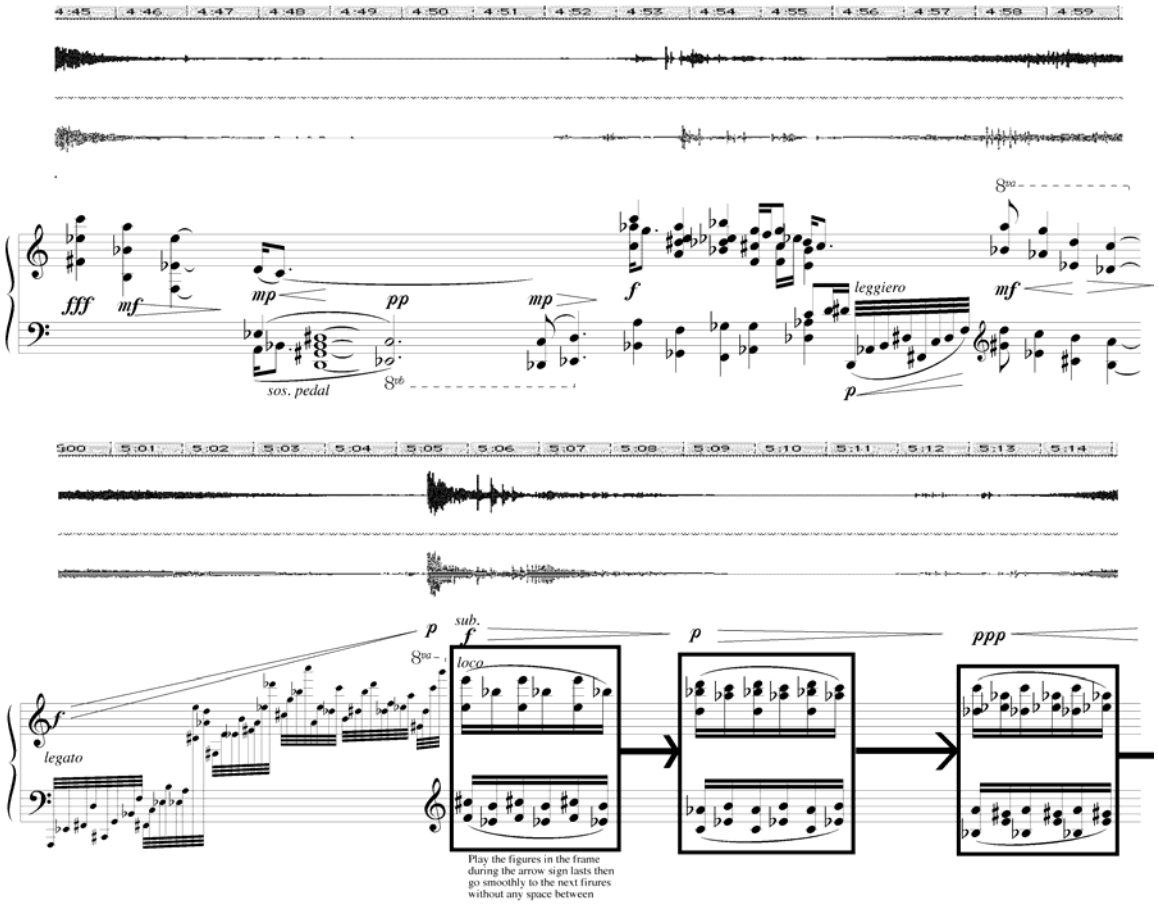
Starting from 4’45, the descending gestures appear more frequently to create an imaginary falling effect. Starting at 5’05, where the piano accompanies the tape part, the main intervals of the first tremolo are tritone and minor sixth. In addition, Major second and minor third are added, followed by the third tremolo, in which Major seventh and minor second are added to create more

complicated sonorities (Example 4). Through the fourth and fifth tremolos and arpeggios, which are based on the seventh, sixth and tritone, a variation of the "Clarence" theme is heard at 5'30 in the lower register gradually evolving to the higher register until 5'56. With the *ff* percussive accent going to *diminuendo*, the "Clarence" motive are repeated three times, and each time the dynamics gets softer from *f* to *pp*, followed by the descending arpeggio going into the gloomy lower register starting from 6'05 – 6'12. At 6'27, introduced with the bell-like chord Ab-C-B variations of the "Clarence" motive A-G and D-E-Gb in soprano voice, which are harmonized with Major seventh and Major sixth (Example 5), are transformed into the tape solo section.

Example 3. Piano passage between 4' – 4'15.



Example 4. 4’45 – 5’15.



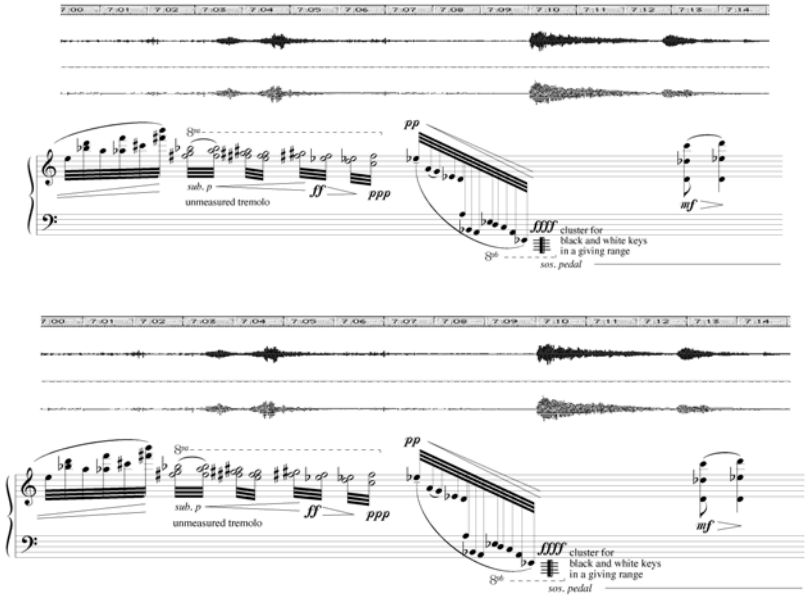
Example 5. Piano passage between 6’27 – 6’29.

Starting at 6’51, the sonority of seconds and thirds in the right hand over Major seventh arpeggio in the left hand goes into the lower register of the piano, which creates, again, the falling dark sound. At 6’59 the upward piano passage leads to the tremolos of the clusters in the high register to create a shimmering crystal sound. This momentum is carried over to the “Clarence” motive at 7’13 with the original pitches, C-D-A-B-natural-E-F-C-E, for the first time without any interruptions between each note. This time the motive is reharmonized with Major and minor sevenths creating displaced cluster sounds led by the rapid dramatic arpeggio starting from *pp* at 7'07 to the low-register cluster with *ffff* at 7'10 (Example 6).

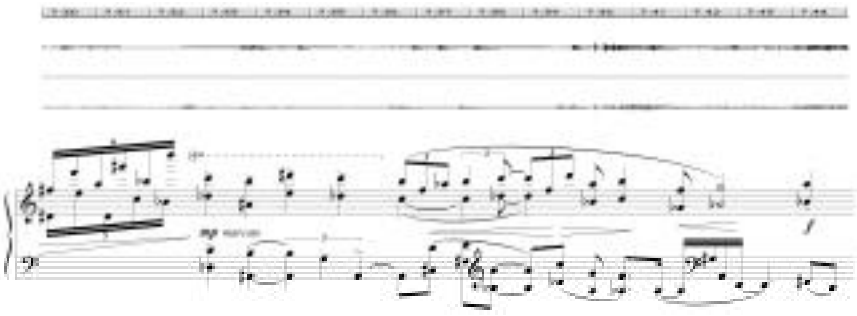
At 7'32, four bell-like chords in the right hand resemble the inversion of the "Clarence" motive with harmonization of Major seventh and Major ninth. With the similar figure in the left hand, each vertical line creates the cluster sounds, which are again scattered into the different registers. At 7'36, the first four notes of the "Clarence" motive with some ornamentations are proceeded to F-G-A-G# instead of E-F-C-E, suggesting rather meandering and unexpected direction (Example 7). These last four chords are answered by bell-like chords at 7'57 and

resolved on E through F at 8'10, which is the retrograde of the first two notes of the second half of the original motive (Example 8).

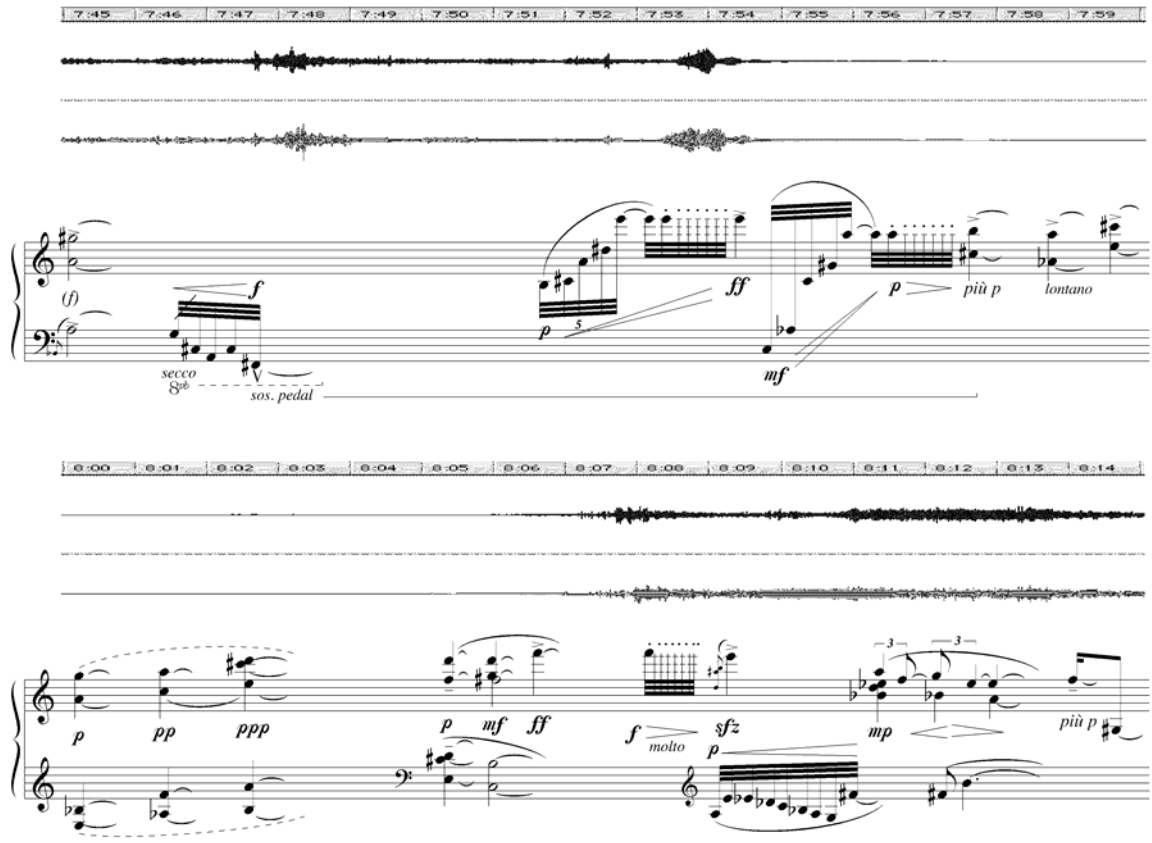
Example 6. 7’00 – 7’30.



Example 7. 7'30 – 7'45.

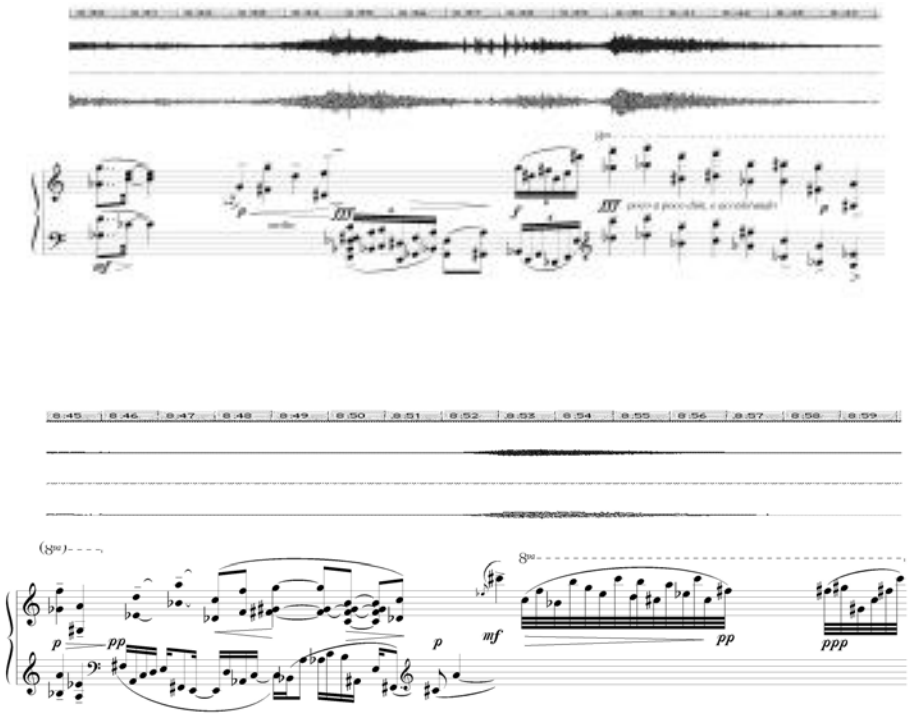


Example 8. 7'45 – 8'15.



At 8'40, the "Clarence" motive is expanded into an eighteen-note figure instead of eight, F-G-D-E-A-A#-G-A-F-A-D-A-C-F-G-B-C-C# in the soprano line, which is combined with the even rhythm of the bell-like figure of 7'32 – 7'36 (Example 9). The interval relationship of each two-note group includes not only the seconds but also Major third, Perfect fourth and Perfect fifth.

Example 9. 8'30 – 9'.

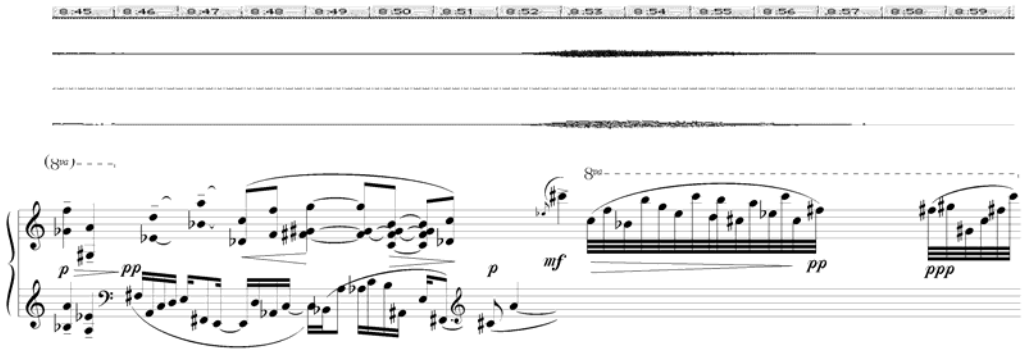


In the fast disjunct passage starting from 9'21 to 9'34, the intervals between the accented notes (C-D-B-F-A-C-G-A) include Major second, minor third and tritone. The tritone, F-B, also appears at 9'36 in the upper voice of the tremolo, which transposed Major second lower, Eb-A, creating the frame of the arpeggios from 9'47 to 9'51 while the bass line moves Eb-F-B emphasizing Major second and tritone (Example 10). Between these two tritone figures, tremolo at 9'36 and arpeggio at 9'47, there are the transitional bell-like figures with the reminiscence of the

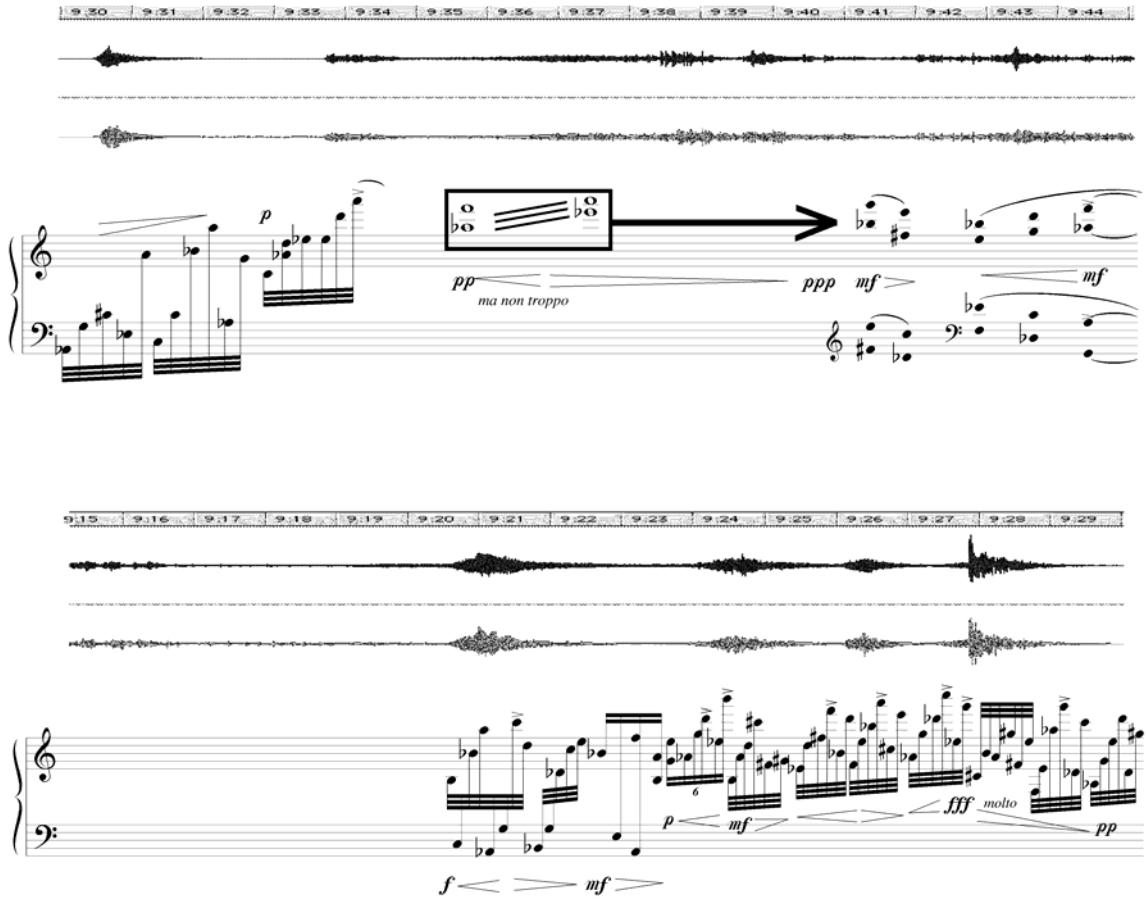
"Clarence" motive, which contains Major and minor thirds and tritone in soprano.

Minor and Major seconds, Perfect fourth, Perfect fifth, tritone and minor sixth, are also applied in the ending part of the work starting from 10'03 to 10'15. The accented notes in the arpeggio passages at 10'03 – 10'08, F-E-A, which resemble the "Clarence" motive, followed by the tremolo figures, in which the upper voices are Eb-B-Bb-C-G-D, integrate into the cluster sonority. Also, the vertical interval relationships in the tremolo sections are Perfect fourth, Perfect fifth, Major sixth, minor and Major sevenths, which is concluded with the cluster chord, all notes between F and E, as the final arrival point (Example 11).

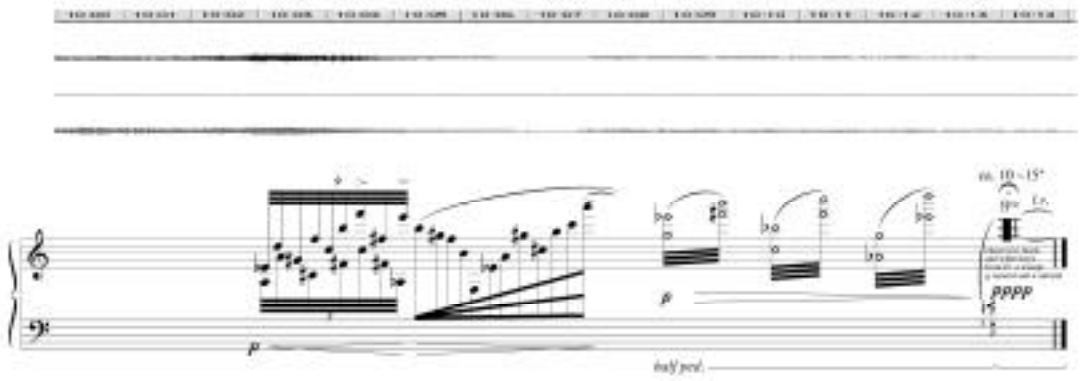
Example 10. 9'15 – 10'00.



(Example 10. 9'15 – 10'00. Cont'd)



Example 11. 10'00 – 10'15.



Rhythm

Although the traditional rhythmic notation is used in the piano part, it is more important to coordinate with the events of the tape. However, the rhythmic notations are suggesting some musical nuances and articulations. For example, in the second half of Example 1, eighth, dotted-eighth, and sixteenth notes should not be interpreted mathematically but rather be performed relevantly to expressing them as musical cognition.

Throughout the piece, the use of the time signature, which implies the organization of the accent patterns, is absent. The rhythms are frequently non-symmetrical as in the music of Stravinsky and Messiaen. The absence of the steady accent patterns were necessary to create flowing and continuous gestures and texture, which derived from my visual imageries.

Form

As well as Part I *Summer Rain - Dawn*, the moment form is used in Part II. Analytically speaking, this piece can be divided into twenty-five moments:

Moment 1.	Piano solo (prelude) before tape starts	(45" - 1')
Moment 2.	0 - 0'24 (Tape starts)	(24")
Moment 3.	0'24 - 0'58	(34")
Moment 4.	0'58 - 1'35	(37")
Moment 5.	1'35 - 2'16	(41")

Moment 6.	2'16 – 3'04	(48")
Moment 7.	3'04 – 3'19	(15")
Moment 8.	3'19 – 4'12	(57")
Moment 9.	4'12 – 4'40	(38")
Moment 10.	4'40 – 5'05	(40")
Moment 11.	5'05 – 5'45	(40")
Moment 12.	5'45 – 6'12	(27")
Moment 13.	6'12 – 6'30	(18")
Moment 14.	6'30 – 6'46	(16")
Moment 15.	6'46 – 7'14	(28")
Moment 16.	7'14 – 7'44	(30")
Moment 17.	7'44 – 8'06	(22")
Moment 18.	8'06 - 8'28	(22")
Moment 19.	8'28 – 8'46	(18")
Moment 20.	8'46 – 8'52	(6")
Moment 21.	8'52 – 9'00	(8")
Moment 22.	9'00 – 9'16	(16")
Moment 23.	9'16 – 9'47	(31")
Moment 24.	9'47 – 9'54	(7")
Moment 25.	9'54 – 10'15	(21")[ii]

Each section exists in the present time and does not evolve linearly or proceed by goal-oriented structure. The horizontal and vertical pitch relationships in the piano part are rather consistent throughout the piece, in which the audience might find some relative development in each piano section. However, consistency in the pitch relationships merely presents a way of organization without evolving as time proceeds. Each section in the tape part expresses the visual imageries discussed earlier, and each timbre represents a metaphor of these imageries, which are juxtaposed like abstract art. With the timbre-changing tape part and pitch-consistent piano part, I wanted to

create musical time in which these two parts wrap around each other folding moment by moment.

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[i] "Black of Redon," is included in Tatsuhiko Shibuya's book, "Gensou no Kanatae" (To the Distance of Fantasy) originally written in Japanese (p. 207) and published in 1988. The text used here is translated into English by myself.

[ii] The actual end of the piece is longer than 21" because the last cluster chord using the damper pedal needs to be sustained until the sound dies away. Probably another 15" to 20" or even longer should be added for the precise duration of Section 25, which depends on the piano, microphone, performance hall, etc.

CHAPTER 5

CONCLUSION

Although the general ideas of *Summer Rain*, including the digital audio technique and the musical analysis of the compositions have been presented in the earlier chapters of this study, the pre-compositional stage, which is not addressed to the listeners as much as it should, has been reserved intentionally until the last two chapters. The pre-compositional stage is very important to me as a composer, and I usually spend more time on this stage than the actual compositional processing. Therefore, it needs to be discussed.

My compositional inspirations are usually derived from other art forms such as visual art and literature, and my personal life. They gradually start being transformed into some visual images or feelings over time. First, the visual images or feelings are rather vague and unorganized. By processing the inspirational sources repeatedly in my head, the vague images and feelings I received are developed further and connect to my own sound world. However, my compositions are not direct translations or realizations of the original sources; rather, they are

based on my own imagination built from original sources and developed separately in my own ways.

The common source of both parts is the German poet, Rilke, although each part is based on a different poem by him, one in French and the other in German. Taking *pleurs* (tears) in "*(Nos Pleurs)*" and *regen* (rain) in "Vor dem Sommerregen," I find some interrelated visual imageries and emotions between them. In addition, my environmental surroundings during both pre-compositional and compositional processes including the unexpected death of my friend's baby for Part II, reflect on my writing, both emotionally (for the mood of the piece) and intellectually (for the planning of the composition such as the pitch organization and forms).

The pre-compositional stage is the preparation for searching and collecting, not only inspirations but also energy to write compositions. After this creative energy was established, my visual images and artistic expressions were realized using two main tools: musical instrument(s) and computer. The languages of these two tools are different from each other: the former is the language of traditional music such as pitch, rhythm and form, and the

latter is the language of digital audio. The old and new languages are melted together in my compositions.

Another crucial aspect of the characteristics of my music is the Japanese cultural background into which I was born and grew up. Compared to the European or European-influenced countries, the sense of space and time is very different in Japan. For example, in *Sumie* (India ink) paintings of Japan, space or absence of colors on paper is treated as an important part of artistic expression. On the contrary, Western paintings tend to fill every space on canvas with colors. Space in Japanese art expresses as much as the colored object. During the composition process, I am not aware of this cultural background nor do I intend to embrace it. However, while making compositional decisions, I am subconsciously choosing the way according to my aesthetics, which are deeply rooted in my cultural background.

In late nineteenth- and twentieth-century music, more composers are interested in and influenced by Japanese and other Asian art, music and literature, Claude Debussy and John Cage among others. In my compositions, the concept of space is transformed into time. Rests or the absence of sound adds spatial and pointillistic gestures to the

compositions. Thus, the absence of sounds is not merely empty but full of sound and images, which remind me of the emanation of all colors in Redon's black.

APPENDIX

AFTER THE SUMMER RAIN

For Amplified Piano and Tape

(2000)

Score

AFTER THE SUMMER RAIN

FOR
AMPLIFIED PIANO AND TAPE

(2000)

Duration: ca. 12 min.

HIDEKO KAWAMOTO

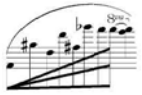
PERFORMER'S NOTES:

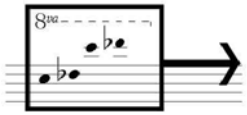
1. Accidentals apply only to the note immediately followed except tied notes.
2. Mute: play the key while the string of the key inside piano is pressed with fingures.

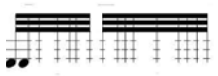
3. Metal chains should be medium-weight. It should be placed inside the piano in advance.

4. Use of a stopwatch during practice and performance are strongly recommended to synchronize the piano and tape parts.

5. Piano part should be played in *rubato* within the given time space. Rhythm should be translated more likely to give nuances to passages instead of to be palyed mathmatically. It is more important that piano should fit in the tape part.

6.  Beamed accelerando: play the beamed notes with gradual increase of speed within the given duration.

7.  Frame notation: repeat playing the notes inside the frame while the arrow sign lasts.

8.  Notes without notehead indicate repetition of the pitch.
Random stems indicate *ad libitum* of rhythm; Closer the distance of stems faster the notes.

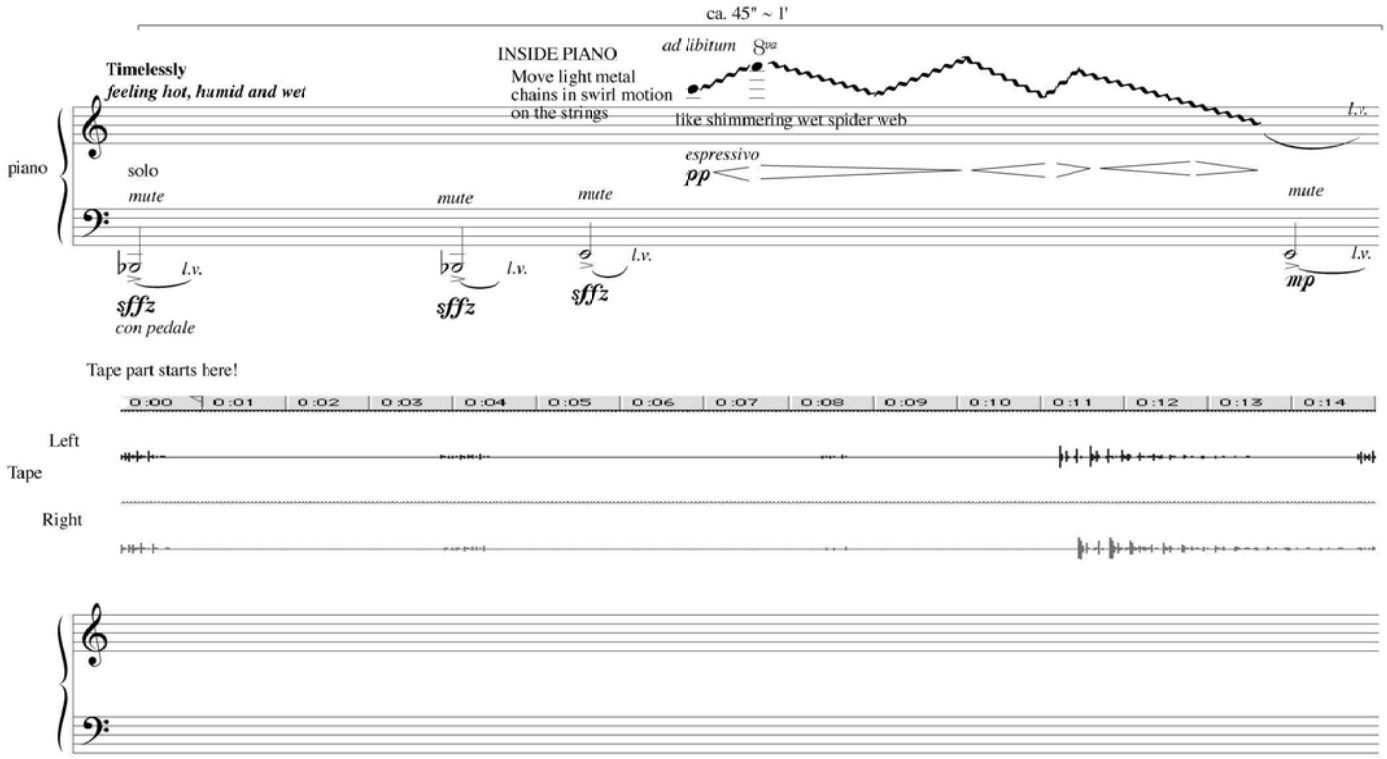
9.  Cluster - play all notes of the given pitch range. Black part indicates the black keys and the white part indicates the white keys on the piano.

After the Summer Rain

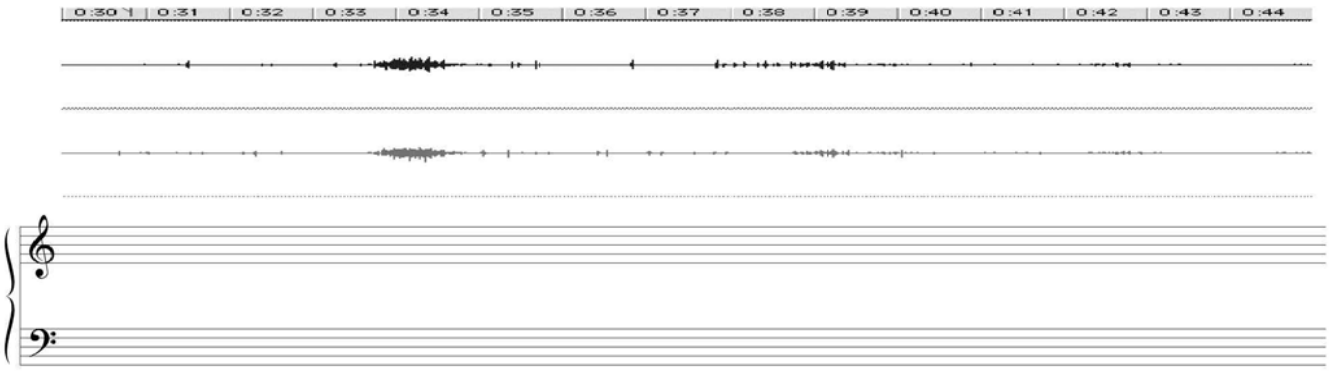
for amplified piano and tape

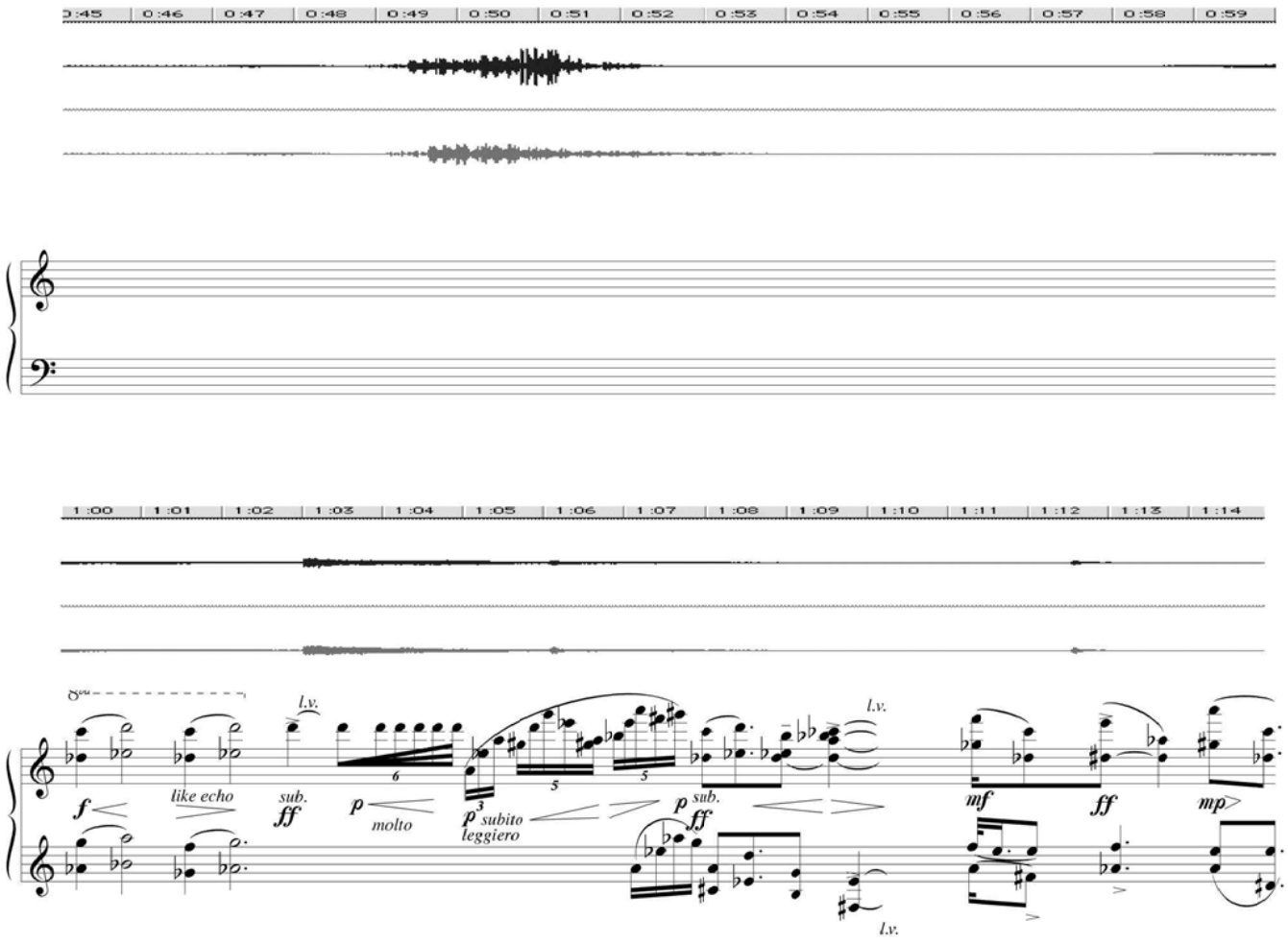
in memory of Clarence Asher Peevey
for Cecilia Ho Peevey

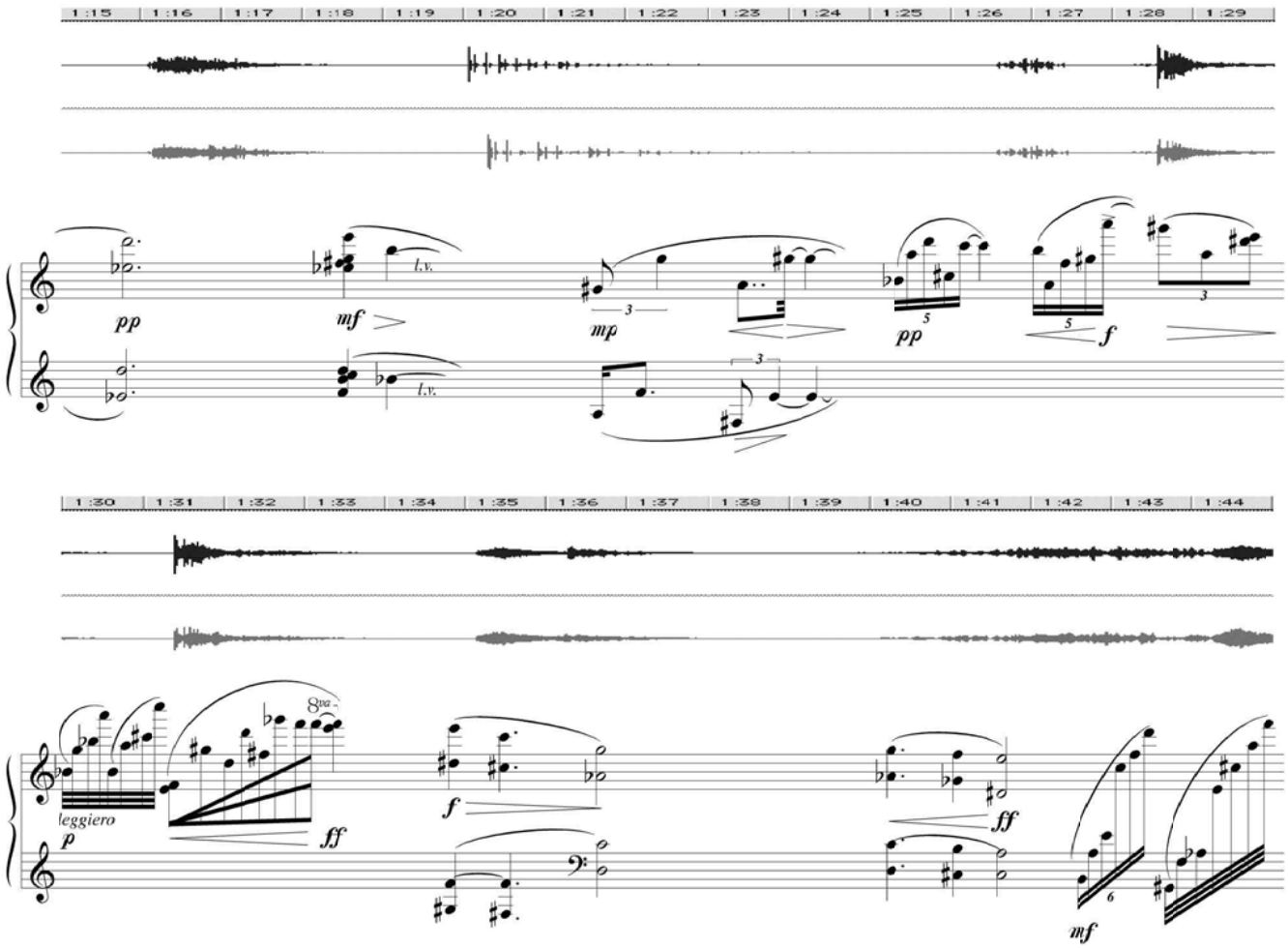
Hideko Kawamoto (2000)

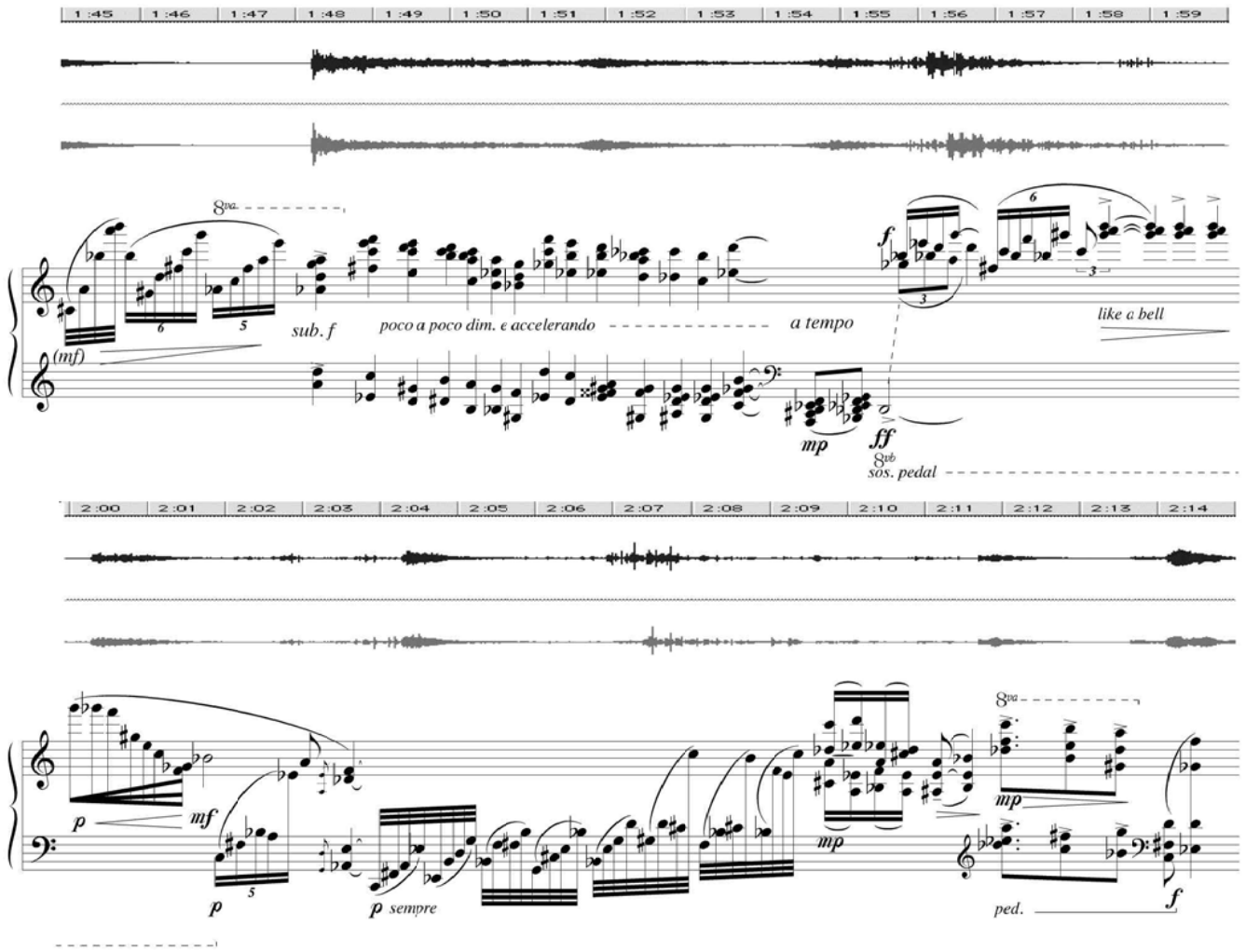


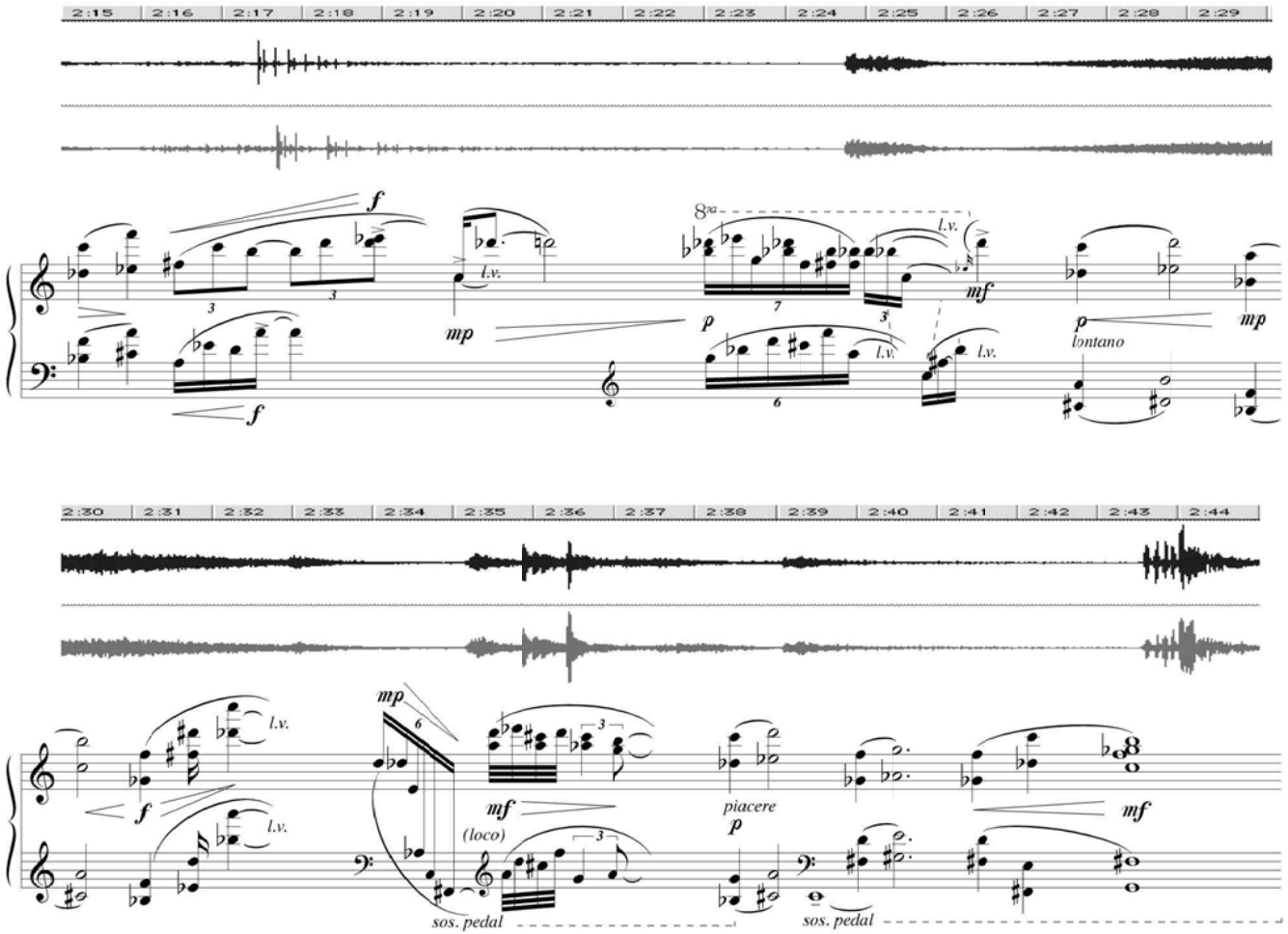

0:15
0:16
0:17
0:18
0:19
0:20
0:21
0:22
0:23
0:24
0:25
0:26
0:27
0:28
0:29

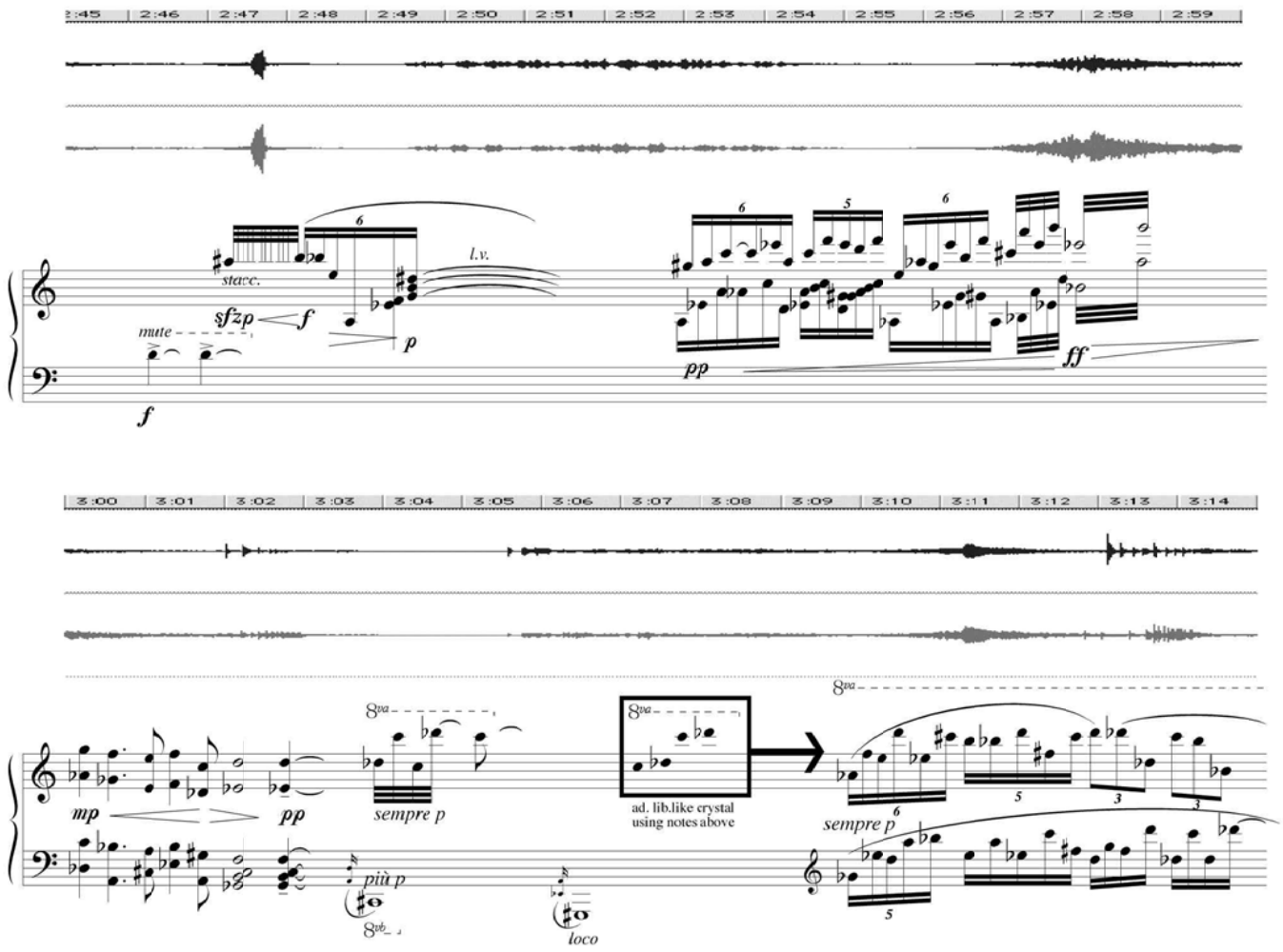

0:30
0:31
0:32
0:33
0:34
0:35
0:36
0:37
0:38
0:39
0:40
0:41
0:42
0:43
0:44

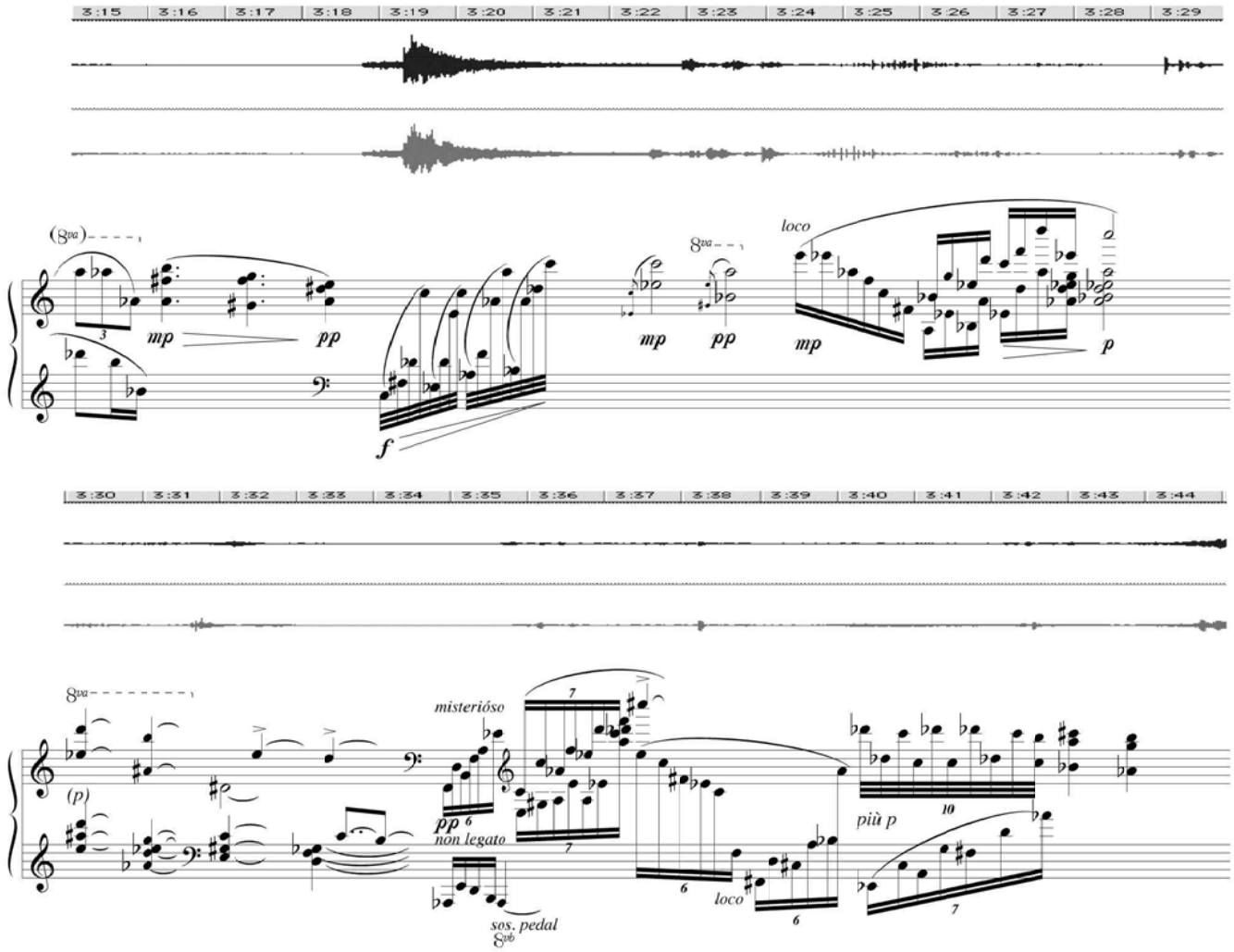

0:45
0:46
0:47
0:48
0:49
0:50
0:51
0:52
0:53
0:54
0:55
0:56
0:57
0:58
0:59
1:00
1:01
1:02
1:03
1:04
1:05
1:06
1:07
1:08
1:09
1:10
1:11
1:12
1:13
1:14
8va
f
like echo
l.v.
sub.
ff
p
molto
6
p 3
subito
leggiero
5
5
p sub.
ff
l.v.
l.v.
mf
ff
mp

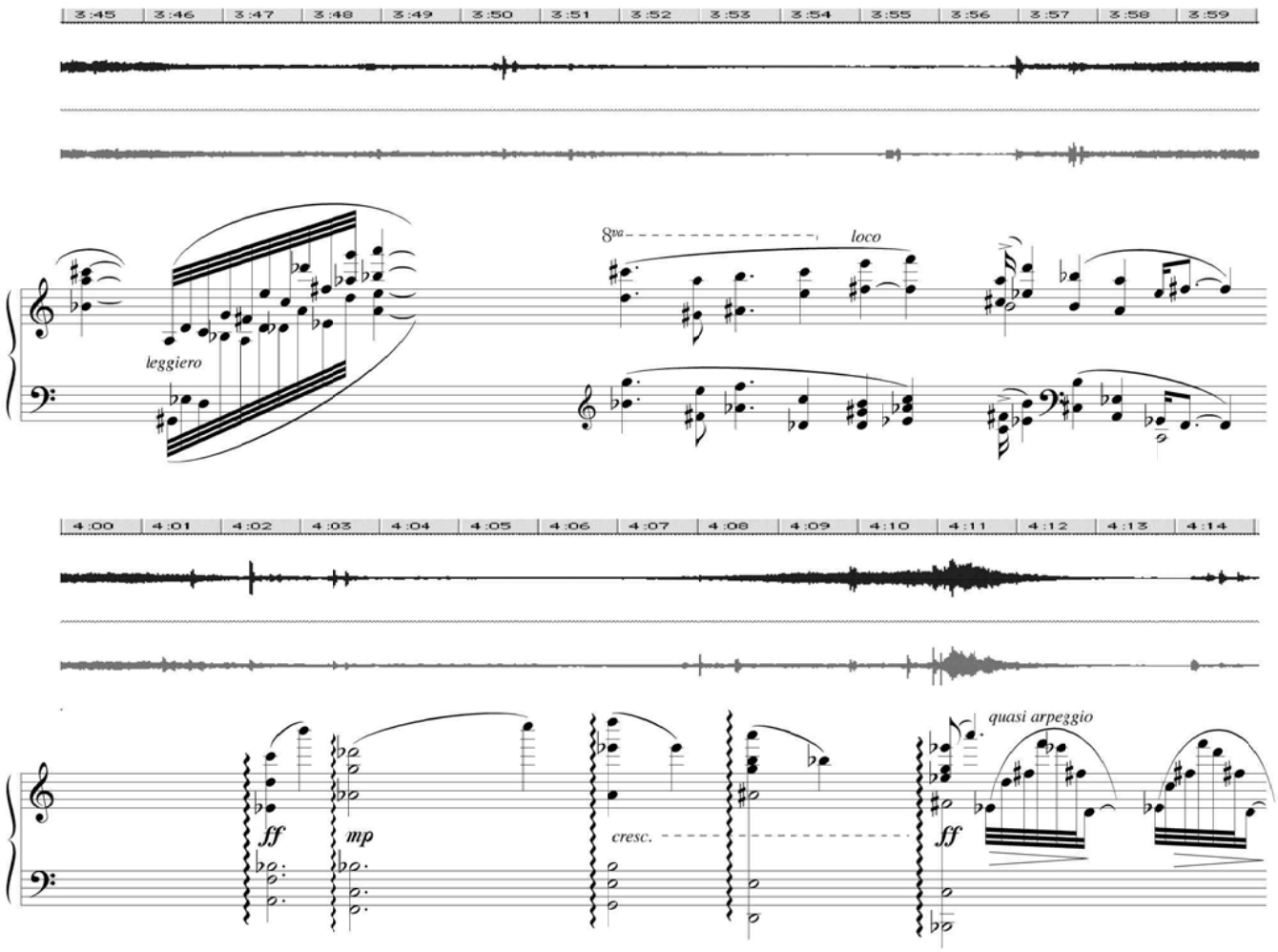

1:15
1:16
1:17
1:18
1:19
1:20
1:21
1:22
1:23
1:24
1:25
1:26
1:27
1:28
1:29
pp
mf
l.v.
l.v.
mp
3
3
pp
5
5
f
3
1:30
1:31
1:32
1:33
1:34
1:35
1:36
1:37
1:38
1:39
1:40
1:41
1:42
1:43
1:44
8va
leggiero
p
ff
f
ff
6
mf


1:45
1:46
1:47
1:48
1:49
1:50
1:51
1:52
1:53
1:54
1:55
1:56
1:57
1:58
1:59
8va
(mf)
sub. f
poco a poco dim. e accelerando
a tempo
f
like a bell
mp
ff
8vb
sos. pedal
2:00
2:01
2:02
2:03
2:04
2:05
2:06
2:07
2:08
2:09
2:10
2:11
2:12
2:13
2:14
p
mf
p
p sempre
mp
8va
mp
ped.
f


2:15 2:16 2:17 2:18 2:19 2:20 2:21 2:22 2:23 2:24 2:25 2:26 2:27 2:28 2:29
f
l.v.
mp
8va
mf
p
lontano
2:30 2:31 2:32 2:33 2:34 2:35 2:36 2:37 2:38 2:39 2:40 2:41 2:42 2:43 2:44
(loco)
piacere
sos. pedal
sos. pedal


2:45 2:46 2:47 2:48 2:49 2:50 2:51 2:52 2:53 2:54 2:55 2:56 2:57 2:58 2:59
stacc.
l.v.
mute
sfzp
f
p
f
pp
ff
3:00 3:01 3:02 3:03 3:04 3:05 3:06 3:07 3:08 3:09 3:10 3:11 3:12 3:13 3:14
8va
mp
pp
sempre p
più p
8vb
loco
ad. lib.like crystal
using notes above
sempre p


3:15 3:16 3:17 3:18 3:19 3:20 3:21 3:22 3:23 3:24 3:25 3:26 3:27 3:28 3:29
(8va)
mp
pp
f
8va
mp
pp
loco
mp
p
3:30 3:31 3:32 3:33 3:34 3:35 3:36 3:37 3:38 3:39 3:40 3:41 3:42 3:43 3:44
8va
(p)
misteriόso
pp
non legato
sos. pedal
8vb
loco
più p


3:45
3:46
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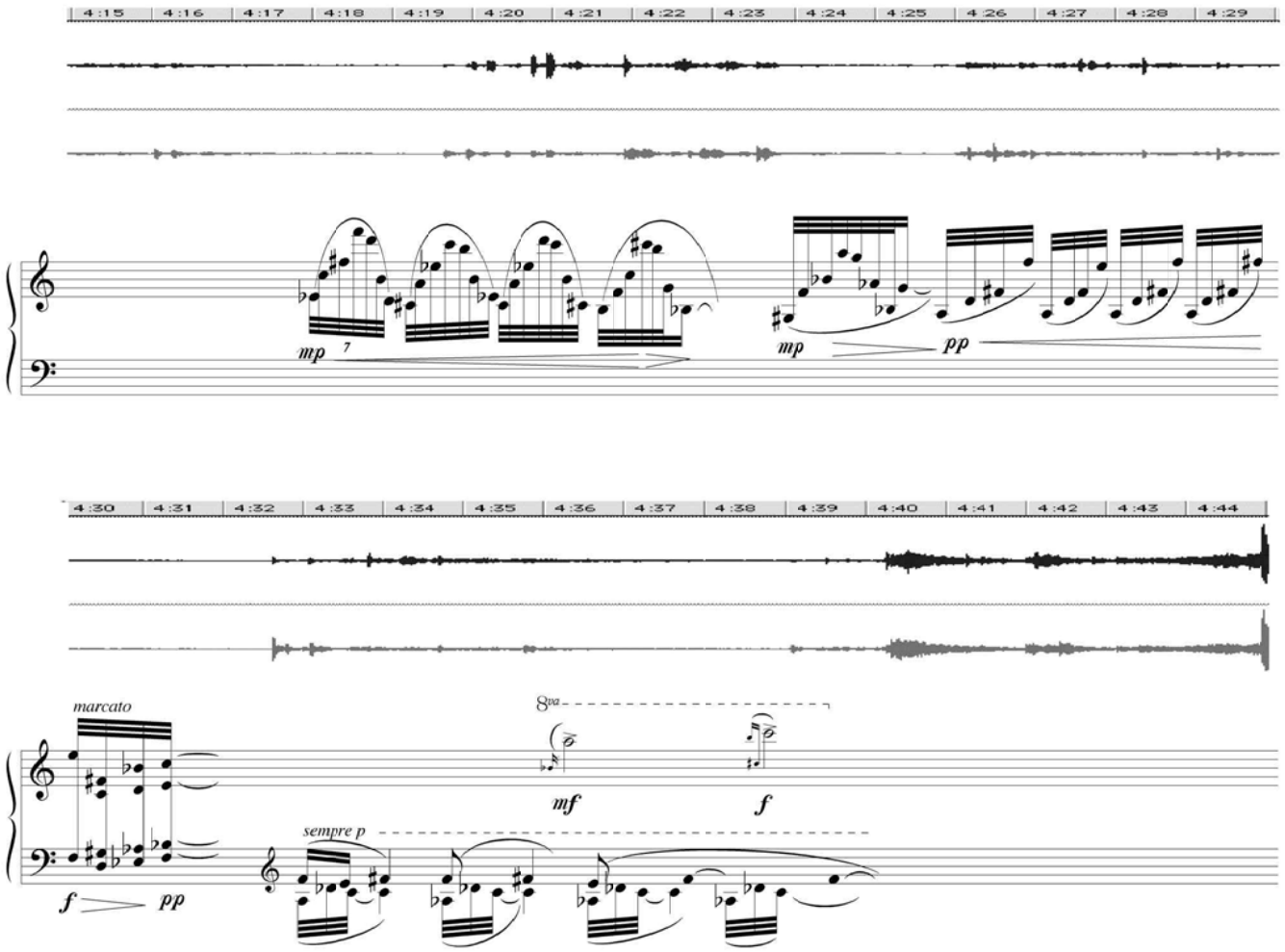
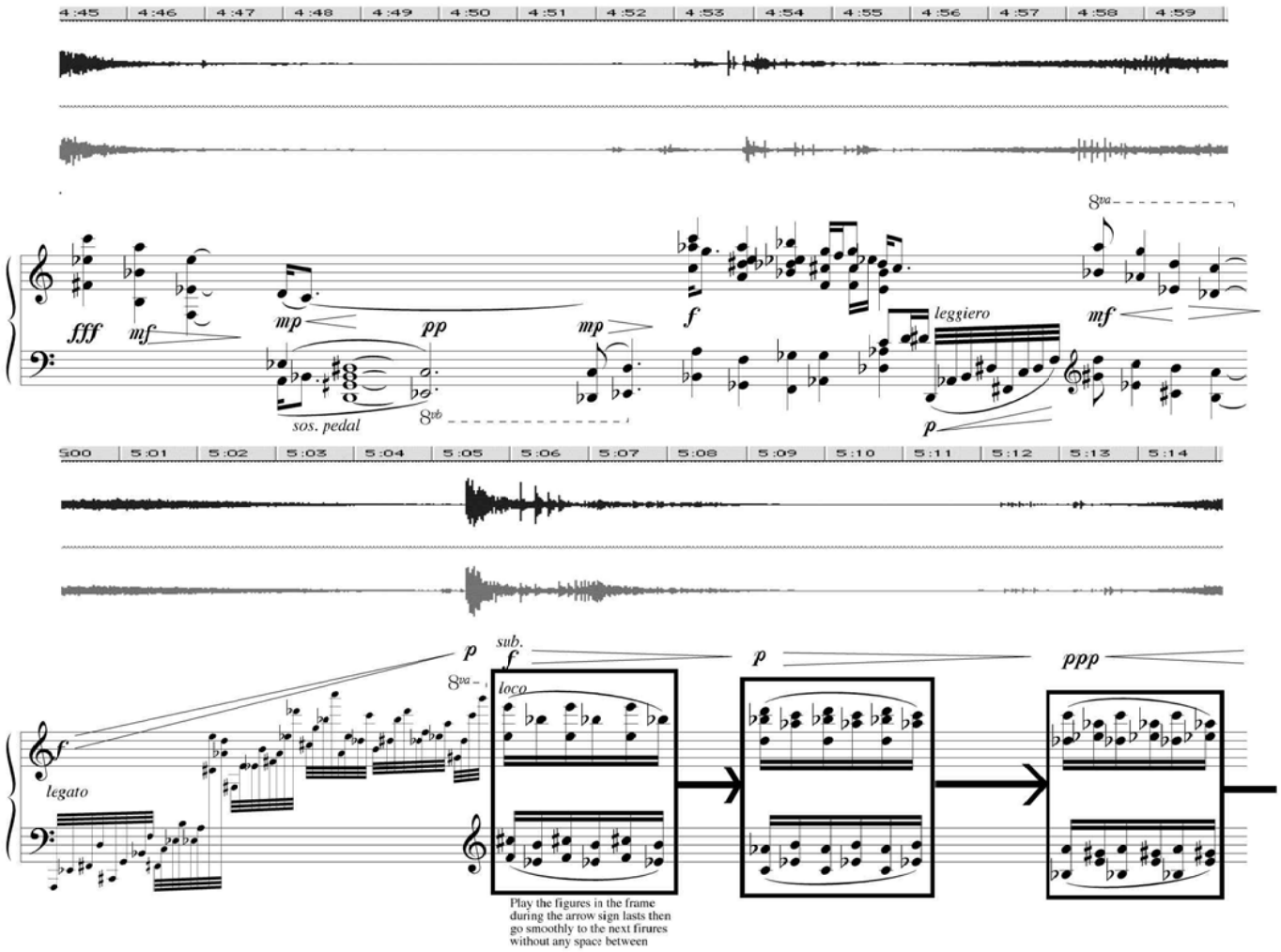
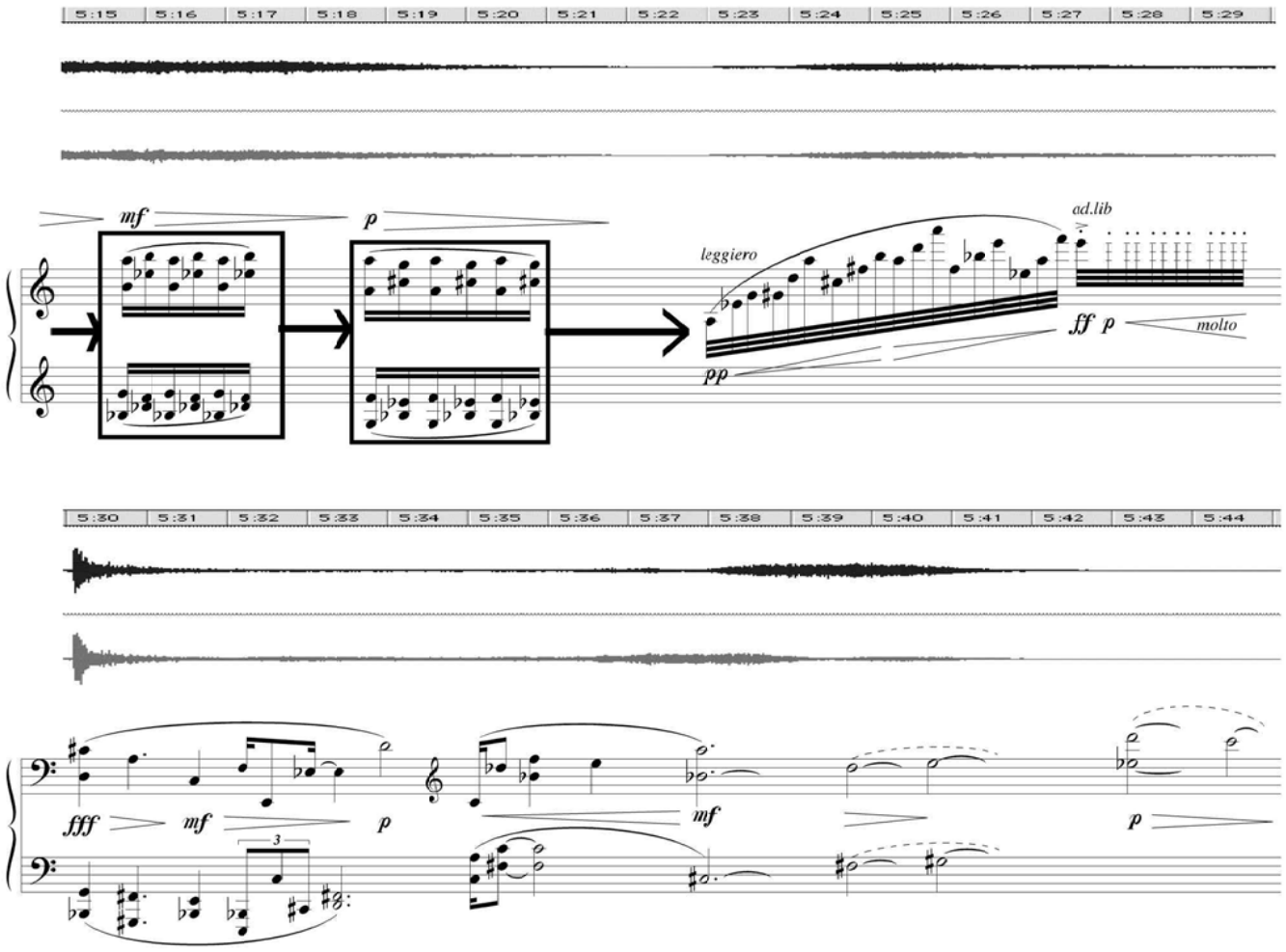
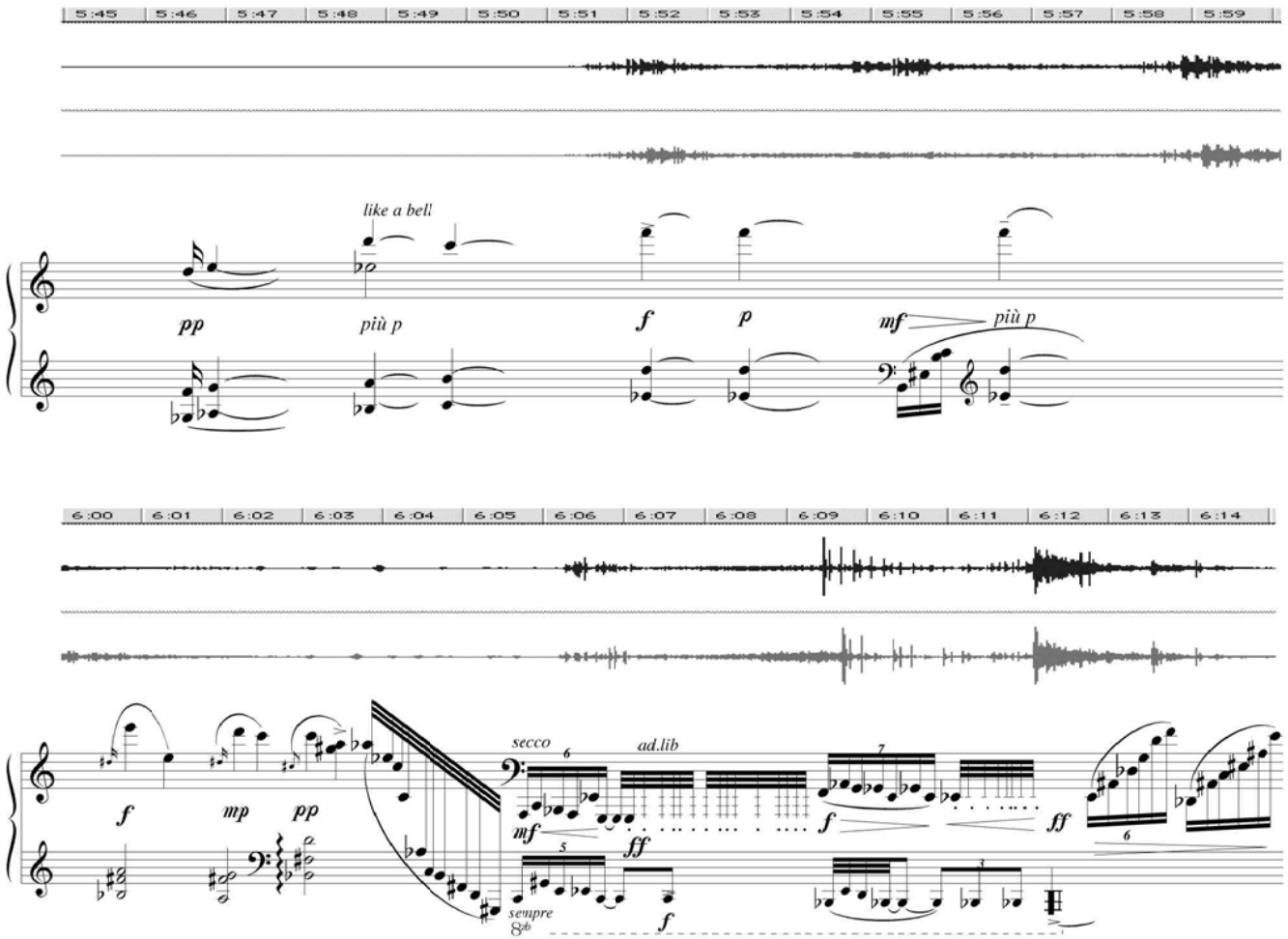
3:48
3:49
3:50
3:51
3:52
3:53
3:54
3:55
3:56
3:57
3:58
3:59
leggiero
8va
loco
4:00
4:01
4:02
4:03
4:04
4:05
4:06
4:07
4:08
4:09
4:10
4:11
4:12
4:13
4:14
ff
mp
cresc.
ff
quasi arpeggio


4:15 4:16 4:17 4:18 4:19 4:20 4:21 4:22 4:23 4:24 4:25 4:26 4:27 4:28 4:29
mp
7
mp
pp
4:30 4:31 4:32 4:33 4:34 4:35 4:36 4:37 4:38 4:39 4:40 4:41 4:42 4:43 4:44
marcato
f
pp
8va
mf
f
sempre p


4:45 4:46 4:47 4:48 4:49 4:50 4:51 4:52 4:53 4:54 4:55 4:56 4:57 4:58 4:59
fff
mf
mp
pp
sos. pedal
8vb
mp
f
8va
leggiero
mf
p
5:00 5:01 5:02 5:03 5:04 5:05 5:06 5:07 5:08 5:09 5:10 5:11 5:12 5:13 5:14
p
legato
sub.
f
8va
loco
p
ppp
Play the figures in the frame during the arrow sign lasts then go smoothly to the next firures without any space between


5:15 5:16 5:17 5:18 5:19 5:20 5:21 5:22 5:23 5:24 5:25 5:26 5:27 5:28 5:29
mf
p
leggiero
ad.lib
ff p
molto
pp
5:30 5:31 5:32 5:33 5:34 5:35 5:36 5:37 5:38 5:39 5:40 5:41 5:42 5:43 5:44
fff
mf
p
3
mf
p


5:45
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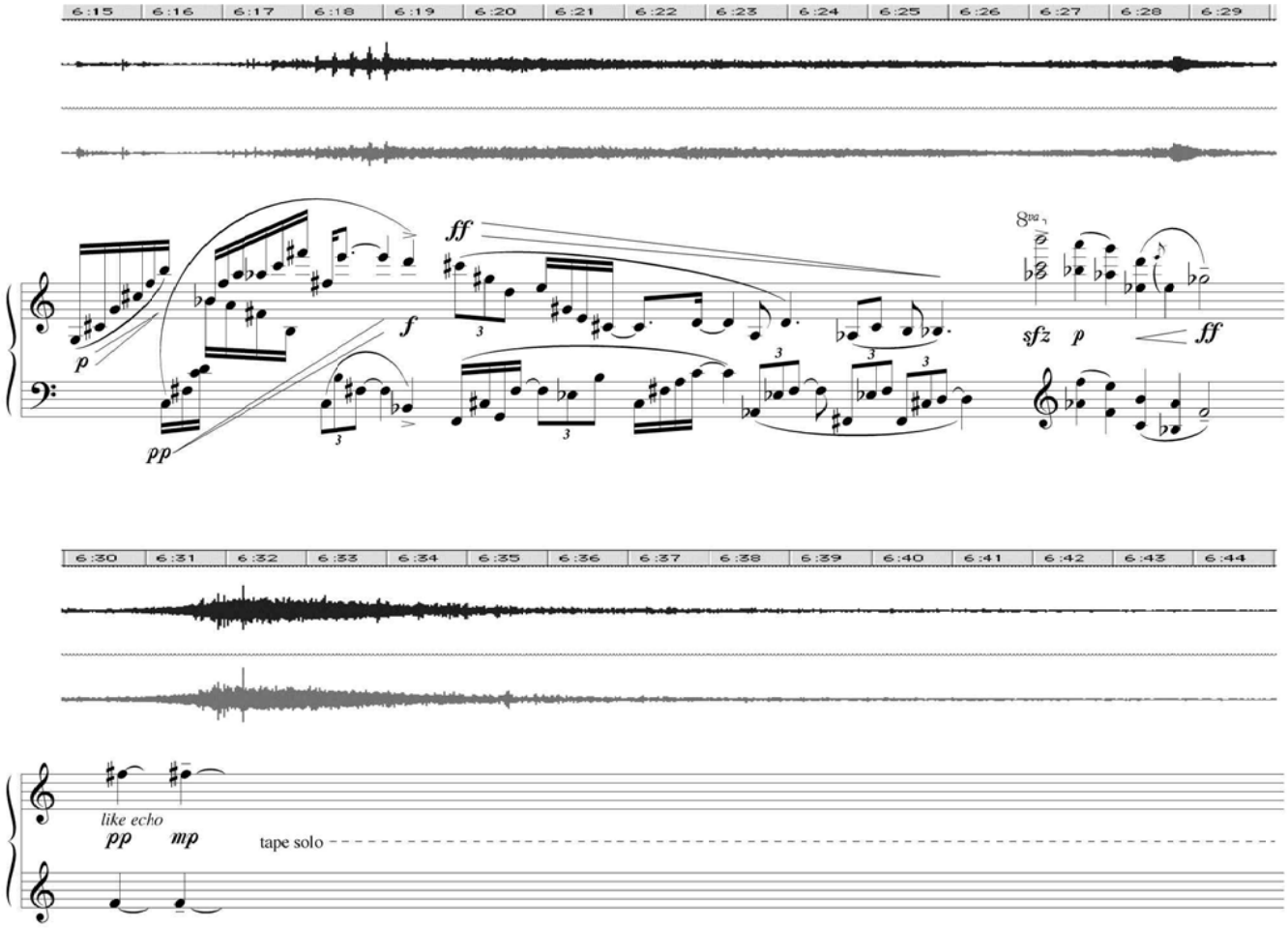
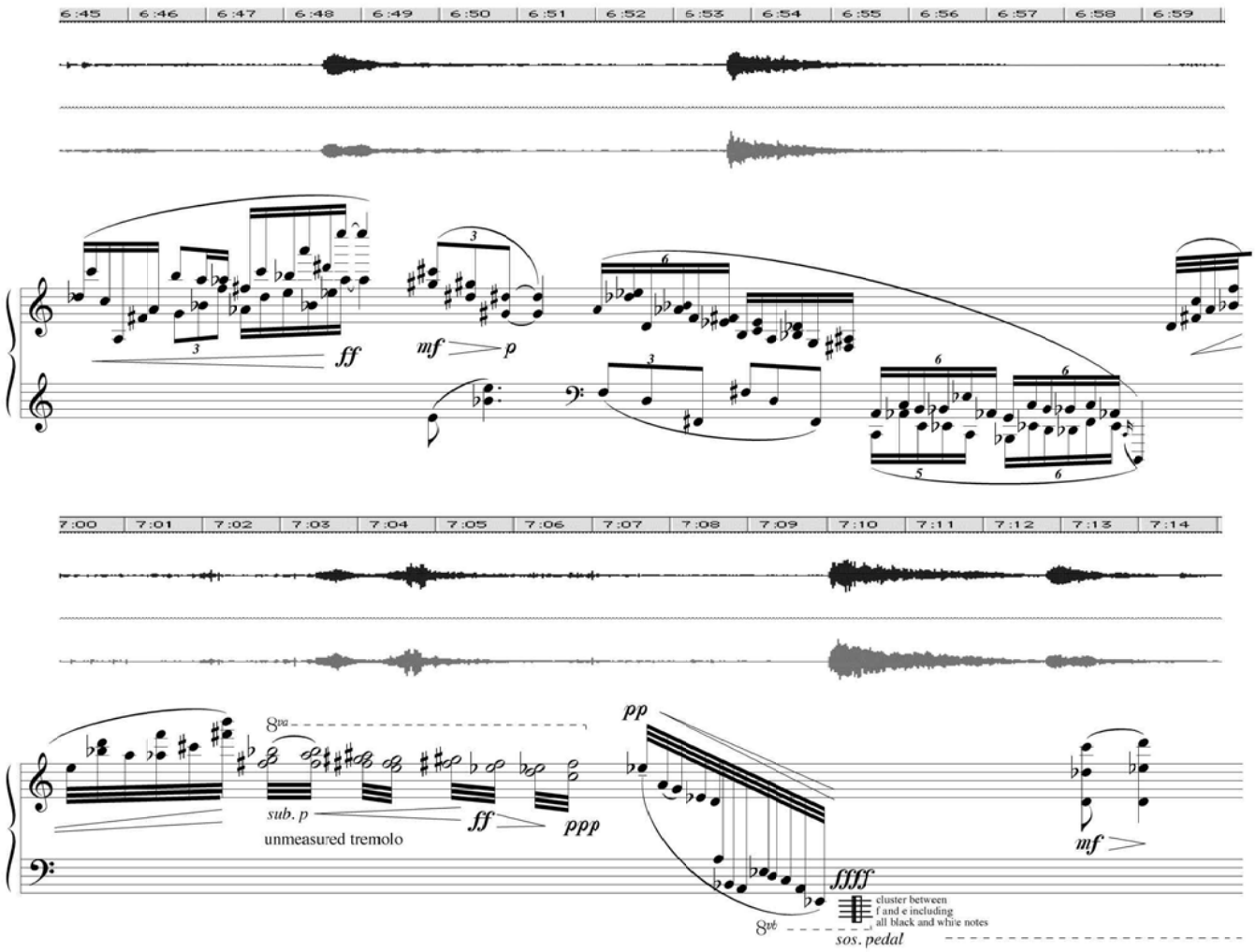
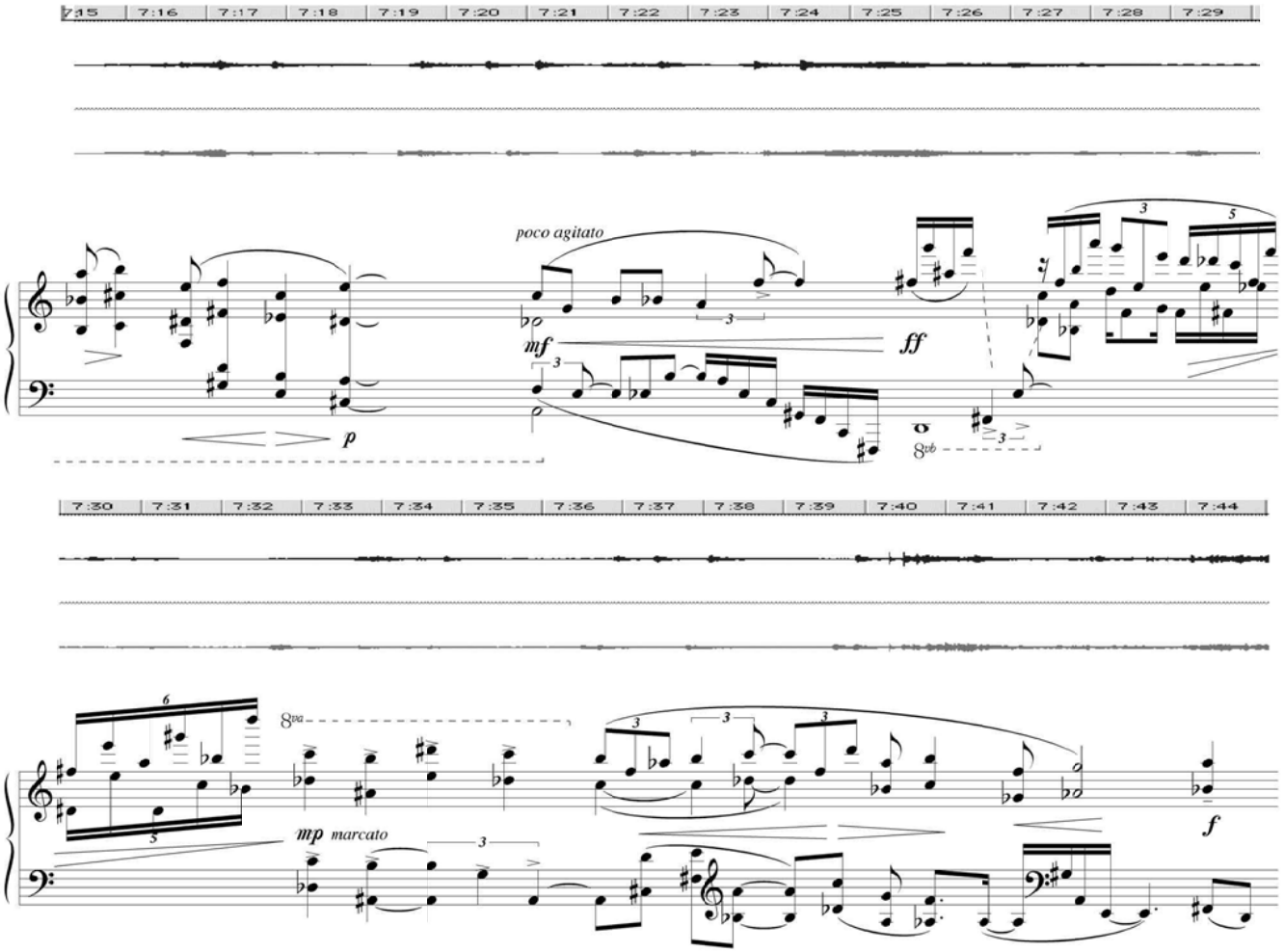
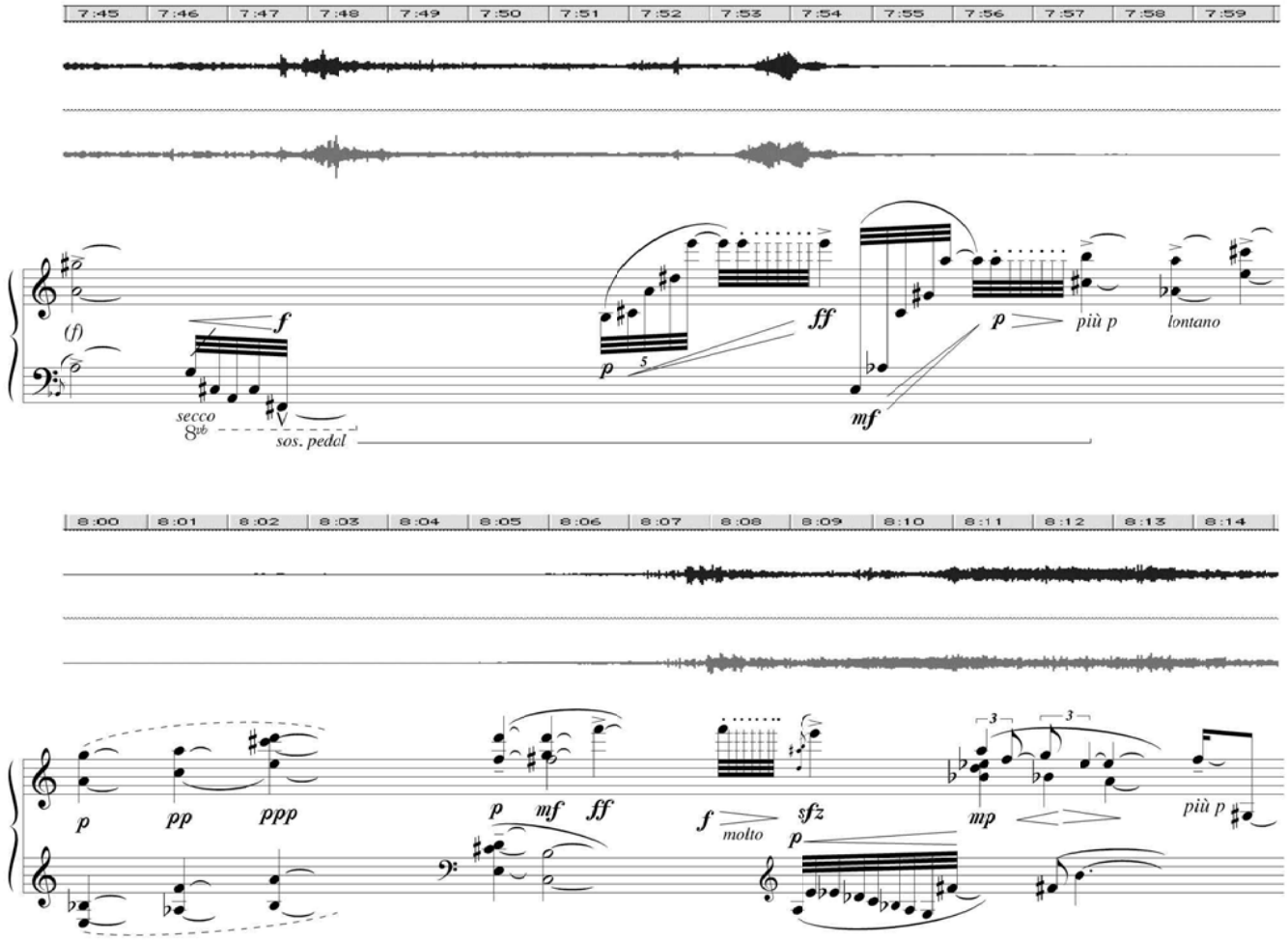
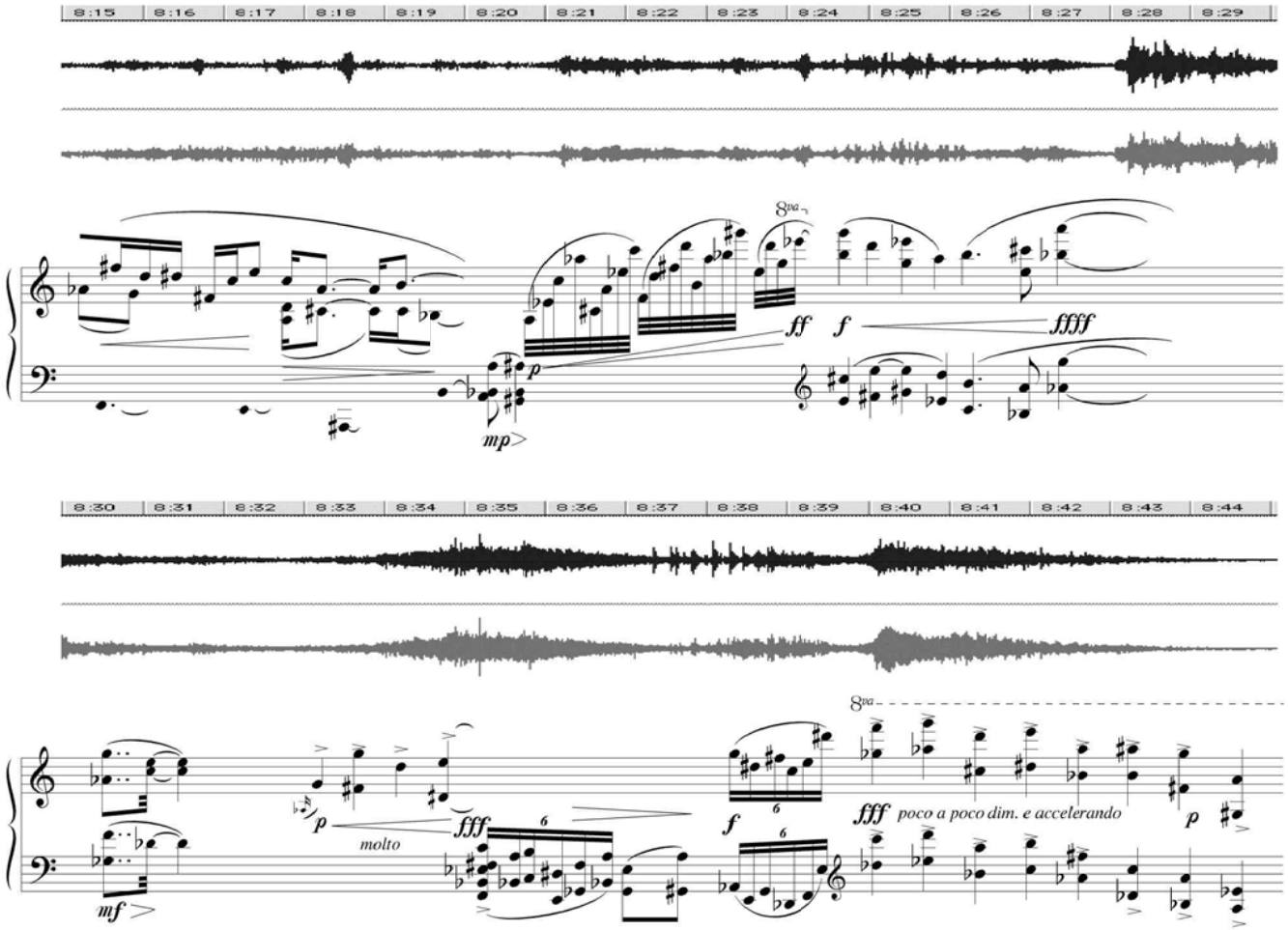
5:48
5:49
5:50
5:51
5:52
5:53
5:54
5:55
5:56
5:57
5:58
5:59
like a bell
pp
più p
f
p
mf
più p
6:00
6:01
6:02
6:03
6:04
6:05
6:06
6:07
6:08
6:09
6:10
6:11
6:12
6:13
6:14
f
mp
pp
secco
ad.lib
mf
ff
sempre
f
f
ff

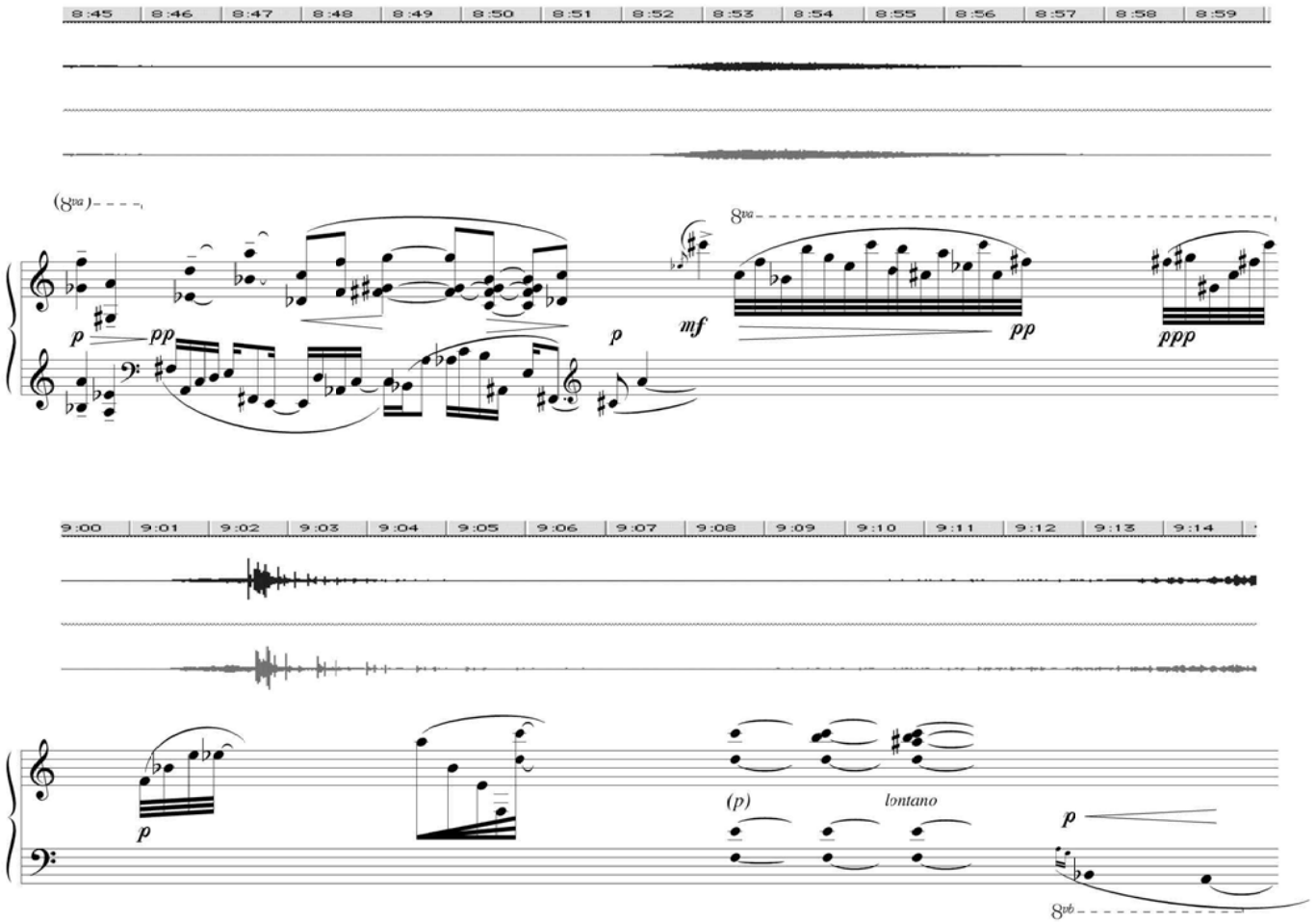

6:15 6:16 6:17 6:18 6:19 6:20 6:21 6:22 6:23 6:24 6:25 6:26 6:27 6:28 6:29
p
pp
f
ff
sfz
p
ff
6:30 6:31 6:32 6:33 6:34 6:35 6:36 6:37 6:38 6:39 6:40 6:41 6:42 6:43 6:44
like echo
pp
mp
tape solo

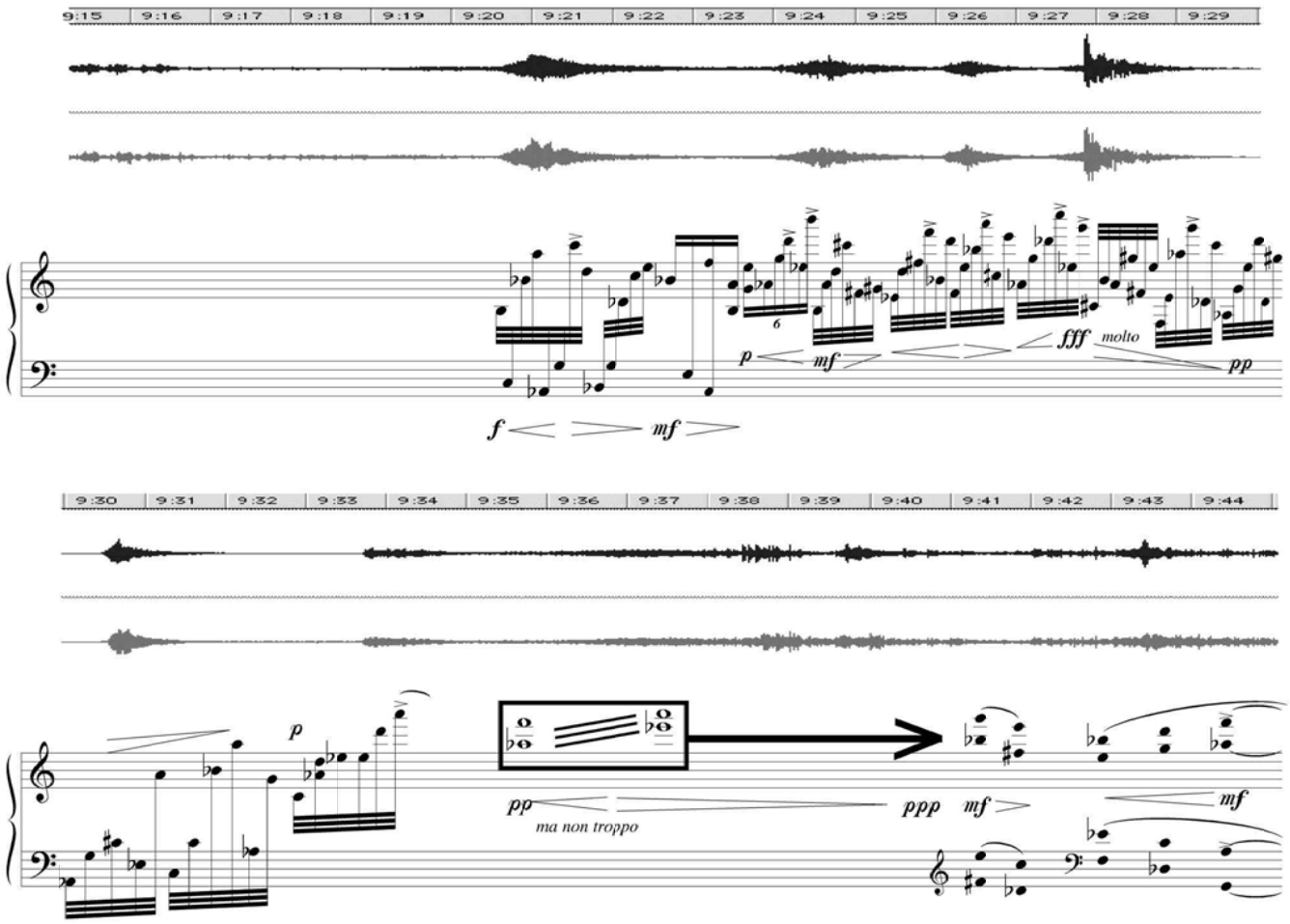

6:45
6:46
6:47
6:48
6:49
6:50
6:51
6:52
6:53
6:54
6:55
6:56
6:57
6:58
6:59
ff
mf
p
7:00
7:01
7:02
7:03
7:04
7:05
7:06
7:07
7:08
7:09
7:10
7:11
7:12
7:13
7:14
8va
sub. p
unmeasured tremolo
ff
ppp
pp
ffff
8vb
cluster between
f and e including
all black and white notes
sos. pedal
mf


7:15 7:16 7:17 7:18 7:19 7:20 7:21 7:22 7:23 7:24 7:25 7:26 7:27 7:28 7:29
poco agitato
p
mf
ff
8vb
7:30 7:31 7:32 7:33 7:34 7:35 7:36 7:37 7:38 7:39 7:40 7:41 7:42 7:43 7:44
8va
mp marcato
f


7:45
7:46
7:47
7:48
7:49
7:50
7:51
7:52
7:53
7:54
7:55
7:56
7:57
7:58
7:59
(f)
f
secco
8vb
sos. pedal
p
5
ff
mf
p
più p
lontano
8:00
8:01
8:02
8:03
8:04
8:05
8:06
8:07
8:08
8:09
8:10
8:11
8:12
8:13
8:14
p
pp
ppp
p
mf
ff
f
molto
sfz
p
3
3
mp
più p


8:15 8:16 8:17 8:18 8:19 8:20 8:21 8:22 8:23 8:24 8:25 8:26 8:27 8:28 8:29
8va
ff
f
ffff
p
mp
8:30 8:31 8:32 8:33 8:34 8:35 8:36 8:37 8:38 8:39 8:40 8:41 8:42 8:43 8:44
8va
mf
p
molto
fff
6
f
6
fff
poco a poco dim. e accelerando
p


8:45
8:46
8:47
8:48
8:49
8:50
8:51
8:52
8:53
8:54
8:55
8:56
8:57
8:58
8:59
(8va)
8va
p
pp
p
mf
pp
ppp
9:00
9:01
9:02
9:03
9:04
9:05
9:06
9:07
9:08
9:09
9:10
9:11
9:12
9:13
9:14
p
(p)
lontano
p
8vb


9:15
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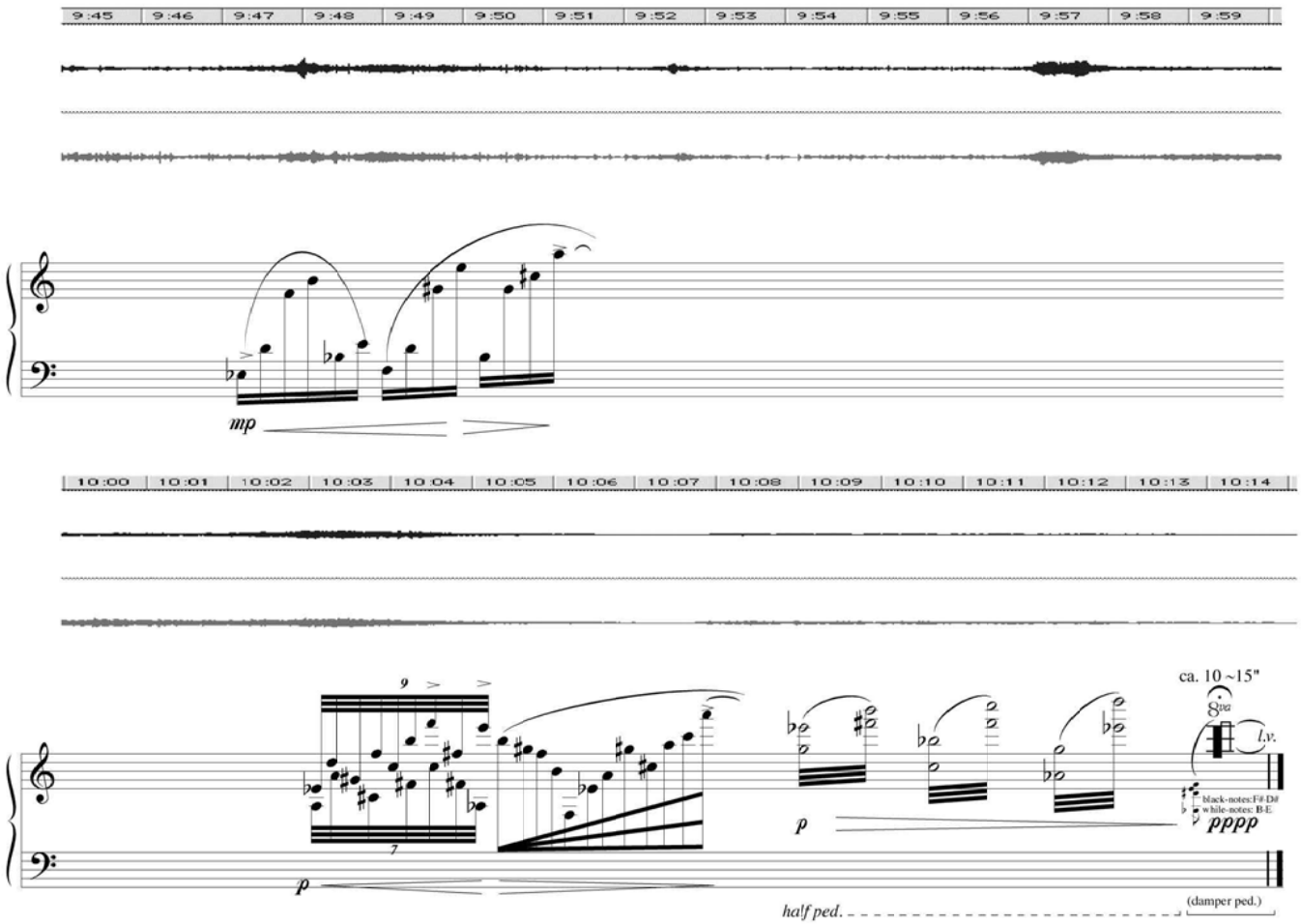
9:21
9:22
9:23
9:24
9:25
9:26
9:27
9:28
9:29
6
p
mf
fff
molto
pp
f
mf
9:30
9:31
9:32
9:33
9:34
9:35
9:36
9:37
9:38
9:39
9:40
9:41
9:42
9:43
9:44
p
pp
ma non troppo
ppp
mf
mf


9:45
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9:48
9:49
9:50
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9:53
9:54
9:55
9:56
9:57
9:58
9:59
mp
10:00
10:01
10:02
10:03
10:04
10:05
10:06
10:07
10:08
10:09
10:10
10:11
10:12
10:13
10:14
ca. 10 ~15"
8va
l.v.
black-notes:F#-D#
while-notes: B-E
pppp
p
p
half ped.
(damper ped.)

REFERENCES

BOOKS:

Chadabe, Joel. Electronic Sound: The Past and Promise of Electronic Music. Upper Saddle River, NJ: Prentice-Hall, 1997.

Chion, Michel. "The State of Musique Concrète," Music, Society and Imagination in Contemporary France, ed. F.-B. Mâche as Vol. 8 part 1 (1993) of Contemporary Music Review, 51-55.

(_____), and G. Reibel. Les musiques electroacoustiques. Paris: INA/GRM, 1976.

Clarke, David. "Structural, Cognitive and Semiotic Aspects of the Musical Present," Music , Mind and Structure, ed. Eric Clarke and Simon Emmerson as Vol. 3, Part 1 (1989) of Contemporary Music Review, 111-131.

Dack, John. "Pierre Schaeffer and the Significance of Radiophonic Art," Timbre Composition in Electroacoustic Music, ed. Simon Emmerson as Vol. 10, Part 2 (1994) of Contemporary Music Review, 3-11.

D'Escrivan, Julio. "Reflections on the Poetics of Time in Electroacoustic Music," Music, Mind and Structure, ed. Eric Clarke and Simon Emmerson as Vol. 3, Part 1 (1989) of Contemporary Music Review, 197-201.

Dobrian, Christopher. MAX Reference, ed. Jon Druckman. Menlo Park, CA: Opcode System/IRCAM, 1990-95.

(_____). MAX: Getting Started, ed. Jon Druckman. Menlo Park, CA: Opcode System/IRCAM, 1990-95.

(_____). MSP: The Documentation, rev. ed. 1.0. Santa Cruz, CA: Cycling ‘74, 1997.

Emmerson, Simon. Language of Electroacoustic Music. London, England: Macmillan, 1986.

(_____). "'Live' versus 'Real-time'," Music, Mind and Structure, ed. Eric Clarke and Simon Emmerson as Vol. 3, Part 1 (1989) of Contemporary Music Review, 95-

101.

Griffiths, Paul. Encyclopedia of 20th-Cenury Music. New York: Thames and Hudson, 1986.

Harrison, Jonty. Diffusion: Theories and Practice, with Particular Reference to the BEAST System (1999). eContact, http://cec.concordia.ca/econtact/diffusion.

Hodgkinson, Tim. "Pierre Schaeffer: An Interview with the Pioneer of Musique Concrete," Recommended Records Quarterly, vol. 2, no. 1 (1987), HTML version.

Kramer, Jonathan. Moment Form in Twentieth Century Music. Music Quarterly LXIV (1978), 177-198.

Johnston, Robert Sherlaw. Messiaen. Berkeley, CA: University of California Press, 1975.

Manning, Peter. Electronic & Computer Music, 2nd ed. Oxford, England: Oxford University Press, 1993.

Messiaen, Olivier. Technique of My Musical Language. Paris, France: Alphones Leduc, 1956.

Rilke, Rainer, Maria. Complete French Poems of Rainer Maria Rilke, trans. A. Poulin, Jr. Saint Paul: Graywolf Press, 1986.

(_____). Selected Poems, trans. C.F. MacIntyre. Berkeley: University of California Press, 1966.

Roads, Curtis. Computer Music Tutorial. Cambridge, Mass: MIT Press, 1996.

Robindoré, Brigitte. "Luc Ferrari: Interview with an Intimate Iconoclast," Computer Music Journal, Vol. 22, No. 3, Fall (1998), 8-16.

Shibusawa, Tatsuhiko. Gensou no Kanatae. Tokyo: Kappa Shobou, 1988.

Smalley, Denis. "Defining Timbre – Reflecting Timbre," Timbre Composition in Elecgtroacoustic Music, ed. Simon Emmerson as Vol. 3, Part 1 (1989) of Contemporary Music Review, 35-48.

Takemitsu, Toru. Dream and Number. Tokyo: Libroport, 1987.

Wishart, Trevor. On Sonic Art. Amsterdam: Harwood Academic Publishers, 1996.

SCORES:

Davidovsky, Mario. Synchronism No. 6 for Piano and Electronic Sounds. New York, NY: E.B. Marks, 1970.

Debussy, Claude. Feuilles mortes. Paris, France: Durand, 1913.

Messiaen, Olivier. Couleurs de la cité céleste. Paris, France: Alphonse Leduc, .1966.

(_____). Neumes rythmiques. Paris, France: Durand, 1949.

Stockhausen, Karlheinz. Kontakte für Elektronische Klänge, Klavier und Schlagzeug. Vienna, Austria: Universal Edition, 1959/60.

Thakemitus, Toru. Rain Tree Sketch for Piano. Mainz, Germany: Schott, 1982.

(_____). Riverrun for Piano and Orchestra. Mainz, Germany: Schott, 1987.

RECORDINGS:

Davidovsky, Mario. Synchronism No. 6 for Piano and Electronic Tape, performed by Aleck Karis. CD 707, CRi.

Debussy, Claude. Feuilles mortes, performed by Walter Giseking, piano. CDH 7 61004 2, EMI.

Dhomont, Francis. Mouvances-métaphores 2. MED 9608, empreintes DIGITALes.

Gobeil, Gill. Le méchanique des ruptures (The Mechanics of Cleavage). IMED-9421-CD, empreintes DIGITALes.

Lippe, Court. Music for Piano and Computer, performed by Yoshiko Shibuya. EAM-9901, Society for Electro-

Acoustic Music in the United States.

Messian, Olivier. Couleurs de la cité céleste, performed by Yvonne Loriod and Orchestre de Domaine musical, and conducted by Pierre Boulez. SMK 68332 Sony Classical.

(_____). Neumes rythmiques, performed by Yuji Takahashi, piano. CO-1052 Denon: PCM Degital.

Stockhausen, Karlheinz. Kontakte für Elektronische Klänge, Klavier und Schlagzeug, performed by David Tudor, Christoph Caskel, Karlheinz Stockhausen and Gottfried Michael Koenig. 286009-2 Wergo.

Takemitsu, Toru. Riverrun for Piano and Orchestra, performed by Paul Crossley, piano; London Sinfonietta; and conducted by Oliver Knussen. 791180-2 Virgin Classic.

Yuasa, Joji. Towards “The Midnight Sun” for Piano and Tape, performed by Aleck Karis, piano. CD 707 CRi.

SOFTWARE:

Burton, Alexander & Piché, Cecilia 1.8. Montréal, Canada: Université de Montréal, 1995-98.

Rolfe, Chris, and Damián Keller. MacPOD 1.2. North Vancouver, Canada: Third Monk Software, 1998-99.

Digidesign. Pro Tools, Version 4.3.2. Palo Alto, CA, 1991-1998.

Erbe, Tom. SoundHack 0.8888. Valencia, CA: Public domain, 1998.

Marco Pranger. Macrohack, Version 1.02. Hague, Netherlands: Institute of Sonology of the Royal Conservatory, 1999.

MicroMat Computer System. SoundMaker 1.0.3. Windsor, CA, 1997.

Prosoniq Products Software. sonicWORX Artist Basic PPC: 1.0 Artist. Karlsruhe, Germany: Public domain,

1990-97.

Sakonda, Nobuyasu. MSP Granular Synthesis V. 2.0. Kobe, Japan: Public domain, 1999.

Zicarelli, David. MSP. Santa Cruz, CA: Cycling ‘74, 1997.

(_____), and Miller Puckett. MAX 3.5.9. Menlo Park, CA: Opcode Systems/IRCAM, 1997.